Toshiba Personal Computer

Satellite M70 /Satellite Pro M70

Maintenance Manual

TOSHIBA CORPORATION

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Toshiba Personal Computer Satellite M70 /Satellite Pro M70 Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite SATELLITE M70 /SATELLITE PRO M70, referred to as the A80/A85 Series in this manual.

The procedures described in this manual are intended to help service technicians isolate faulty Field Replaceable Units (FRUs) and replace them in the field.

SAFETY PRECAUTIONS

Four types of messages are used in this manual to bring important information to your attention. Each of these messages will be italicized and identified as shown below.

DANGER: *"Danger" indicates the existence of a hazard that could result in death or serious bodily injury if the safety instruction is not observed.*

WARNING: *"Warning" indicates the existence of a hazard that could result in bodily injury if the safety instruction is not observed.*

CAUTION: *"Caution" indicates the existence of a hazard that could result in property damage if the safety instruction is not observed.*

NOTE: *"Note" contains general information that relates to your safe maintenance service.*

Improper repair of the computer may result in safety hazards. Toshiba requires service technicians and authorized dealers or service providers to ensure the following safety precautions are adhered to strictly.

- Be sure to fasten screws securely with the right screwdriver. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.

- If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

Chapter 1	Hardware Overview describes the A80/A85 Series system unit and each FRU.
Chapter 2	Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
Chapter 3	Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
Chapter 4	Replacement Procedures describes the removal and replacement of the FRUs.
Appendices	The appendices describe the following:

- Handling the LCD module
- Board layout
- Pin assignments
- Keyboard scan/character codes
- Key layout
- Screw torque list
- Reliability

Conventions

This manual uses the following formats to describe, identify, and highlight terms and operating procedures.

Acronyms

On the first appearance and whenever necessary for clarification acronyms are enclosed in parentheses following their definition. For example:

Read Only Memory (ROM)

Keys

Keys are used in the text to describe many operations. The key top symbol as it appears on the keyboard is printed in **boldface** type.

Key operation

Some operations require you to simultaneously use two or more keys. We identify such operations by the key top symbols separated by a plus (+) sign. For example, **Ctrl + Pause (Break)** means you must hold down **Ctrl** and at the same time press **Pause (Break)**. If three keys are used, hold down the first two and at the same time press the third.

User input

Text that you are instructed to type in is shown in the boldface type below:

DISKCOPY A: B:

The display

Text generated by the computer that appears on its display is presented in the type face below:

```
Format complete
System transferred
```

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Chapter 1

Hardware Overview

Chapter 1 Contents

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1.1 Features

The Satellite M70 Series Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight and high reliability. This computer incorporates the following features and benefits:

- CPU
  - Intel® Celeron® M Processor 350J/360J/370/380
  - Intel® Pentium® M Processor 725A/730/740/750/760/770/780

- Chipset
  - ATI Radeon® Xpress 200M +ATI IXP450
  - Mobile Intel® 915PM Express Chipset for external graphics controller
  - Mobile Intel® 915GM Express Chipset for integrated graphics controller
    (Chipset depends on the model you purchased)
  - ATI Mobility® Radeon® X600SE
  - ATI Mobility® Radeon® X700
    (GPU depends on the models you purchased)
  - ENE KB910 for Keyboard Controller, Battery management Unit, and RTC.
  - ENE CB1410 for PCMCIA controller
  - TI PCI7411 Multiple Digital Media Card Slot, IEEE 1394 and PCMCIA Controller
  - TI PCI4510, IEEE1394 and PCMCIA Controller
  - Realtek ALC250 for AC97 CODEC.
  - Realtek RTL8100CL for 10M/100M LAN

✍ Memory

? DDRII-533MHz specification compliant

? Dual channel support

? No On board memory

? Two DDRII SODIMM with 256MB/512MB/1GB ,

? Max. upgrade to 2GB with 2 DDRII SODIMM Socket

✍ BIOS

? 1MB Flash ROM for system BIOS.

? Suspend to RAM/Disk.

? Password protection (System).

? Various hot key for system control.

? Refreshable

? Complete ACPI 1.0B Function

✍ Power

? 4-cell Lithium Ion smart battery pack with 14.4V*2000mAh

? 6-cell Lithium Ion smart battery pack with 10.8V*4000mAh

? 8-cell Lithium Ion smart battery pack with 14.4V*4300mAh

? Approximately 12 hours or longer charging time to 100% battery capacity with system switched on.

? Approximately 3 hours charge time to 100% battery capacity with system switched off.

? Approximately 1.5 days discharging time in Standby Mode for the 8-cell battery, 1 day for the 6-cell battery and 0.75 days for 4-cell battery.

? Discharge time in shutdown mode is approximately 1 month

✍ HDD

? 9.5mm, 2.5" HDD up to 120 GB

? Bus Master IDE

? 9.5m/m, 2.5”HDD Support

? Serial ATA and Parallel ATA

✍ Fixed Device Drivers

? 5.25” 12.7mm height CD-RW & DVD-ROM drive

? 5.25” 12.7mm height DVD Super Multi drive supporting ±R Double Layer

- Optional Devices
  - 256/512/1024MB SO-DIMM DDRII modules
  - Li-ION Battery Pack
  - AC adapter
  - USB FDD Kit

- Keyboard

  The computer's keyboard layout is that of a 101/102-key enhanced keyboard.

  There are four types of keys: typewriter keys, function keys, soft keys and cursor control keys. The typewriter keys are gray. The other keys are dark gray.

- TouchPad

  This pointing control device, located in the center of the keyboard palm-rest, provides convenient control of the cursor without requiring desk space for a mouse. The TouchPad incorporates two mouse buttons.

- Display
  - 15.4" TFT screen with a resolution of 1280 horizontal x 800 vertical pixels WXGA 150nits
  - 15.4" TFT screen with a resolution of 1280 horizontal x 800 vertical pixels WXGA 150nits CSV
  - 15.4" TFT screen with a resolution of 1280 horizontal x 800 vertical pixels WXGA 200nits
  - 15.4" TFT screen with a resolution of 1280 horizontal x 800 vertical pixels WXGA 200nits CSV

- I/O Ports
  - USB (V2.0, horizontal type) x 3 (2 in rear side, 1 in left side)
  - RGB; One DDC2b compliant VGA port , 15pins (left side)
  - S-Video (left side)
  - Microphone jack (front side)
  - Headphone jack (front side)
  - VR volume control (front side)
  - Wireless Communication Switch and WLAN indicator (some models may not have this feature).
  - DC-In jack (rear side)
  - RJ-11 jack for 56Kbps V.92 Modem (rear side)

- ? RJ-45 jack with LED indicator (rear side)
- ? Kensington lock (rear side)
- ? IEEE 1394
- ? 5 in 1 Card reader (front side)
- ? ExpressCard (some models may not have this feature).
- ? PCMCIA with shutter door (Left side)

✍ PC Card Slot

- ? One type II card socket
- ? 1.8" 10.5mm removable ATA Device
- ? Card bus card or PC Care with hot insertion and removal
- ? ACPI 1.1 Compliant.
- ? Support 5V/3.3V PC Cards and 3.3V Cardbus cards.
- ? Supports PCMCIA-ATA Specification.

✍ Express Card Slot

- ? One Express Cardslot (some models may not have this feature).

✍ Multiple Digital Media Card Slot

- ? Supports xD, SD, MS, MS Pro and MMC

✍ Communication

- ? Modem: V90 (V.92)/56K bps specification compliant and 14.4K bps Send/Receive Fax with MDC solution
- ? V92/56K bps (US/Canada/UK/GR/FR)
- ? V90/56K bps (other countries)
- ? LAN: Realtek 8100CL (On Board 10/100Mbps) RTL8110SBL(BTO)
- ? WOL from S3 on AC/Battery mode.

✍ Wireless LAN

- ? 802.11g: WLL3092-D4(MOW-LF) 54M 11/13CH (MB51L) (RoHS).
- ? 802.11a+g: Atheros WLL4071-D4(MOW) 54M 11/13CH (MB62HL) (RoHS)
- ? Module integrated for Mini-PCI interface.
- ? Easy service for WLAN.
- ? Wireless communication killer switch (BTO)
- ? Support MiniPCI IIIB

? Support Intel Wireless Coexistence system with Taiyo Yuden V2.0

✍ Universal Serial Bus (USB)

The computer has three Universal Serial Bus (USB) ports that comply with the USB 2.0 standard, which enable data transfer speeds more than 40 times faster than USB 1.1 (which this computer also supports.) The USB drives may be used to transfer data at Low, Full, and high speeds.

✍ External monitor port

A 15-pin CRT port supporting DDC 2B enables connection of an external monitor, which is recognized automatically by Video Electronics Standards Association (VESA) Display Data Channel (DDC) compatible functions.

✍ Sound system

Windows® Operating System compatible sound system provides internal speakers as well as jacks for an external microphone and headphone.

✍ TV-out (S-Video) port

Plug a 4-pin S-video cable into this connector for output of NTSC or PAL signal.

✍ LAN port

The computer comes with an RJ-45 Local Area Network (LAN) port. The LAN port provides connectivity for LAN.

1.2 System Unit

The system unit is composed of the following major components:

- ✍ Processor
  - ? Intel® Celeron® M CPU up to 1.7GHZ 0.09u, 1M L2, FSB 400MHz
  - ? Intel® Pentium® M CPU up to 2.26GHZ 0.09u, 2M L2, FSB 533MHz
  - ? Micro FC-PGA package CPU

- ✍ System Logic
  - ? ATI Radeon® Xpress 200M +ATI IXP450
  - ? Mobile Intel® 915PM Express Chipset for external graphics controller
  - ? Mobile Intel® 915GM Express Chipset for integrated graphics controller
  - ? ATI Mobility® Radeon® X600SE
  - ? ATI Mobility® Radeon® X700
  - ? ENE KB910 for Keyboard Controller, Battery management Unit, and RTC.
  - ? ENE CB1410 for PCMCIA controller
  - ? TI PCI7411 Multiple Digital Media Card Slot, IEEE 1394 and PCMCIA Controller
  - ? TI PCI4510, IEEE1394 and PCMCIA Controller
  - ? Realtek ALC250 for AC97 CODEC.
  - ? Realtek RTL8100CL for 10M/100M LAN

- ✍ Keyboard Controller
  - ? ENE KB910 is use as Keyboard Controller and Battery management unit.

- ✍ Memory
  - ? DDRII-533MHz specification compliant
  - ? Dual channel support
  - ? No On board memory
  - ? Two DDRII SODIMM with 256MB/512MB/1GB ,
  - ? Max. upgrade to 2GB with 2 DDRII SODIMM Socket

✍ Audio subsystem

- ? Realtek 250D
- ? Microphone-in and headphone-out.
- ? No internal Microphone.
- ? Two stereo speakers
- ? Sound effect by SRS software
- ? Volume control : Dial type
- ? Supports Harman Speakers
- ? Speaker Volume over 10cc

1.3 2.5-inch Hard Disk Drive

The internal HDD is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads. The computer supports hard drives up to 100 GB.

The HDD is shown in Figure 1-1. Specifications are listed in Table 1-1 and Table1-2.

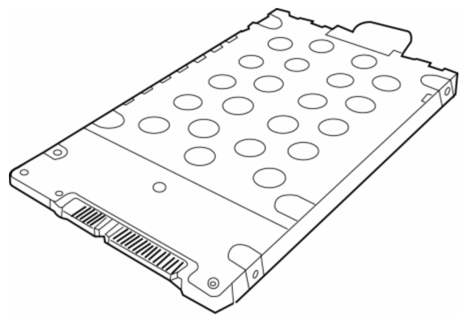


Figure 1-1 2.5-inch HDD

Items	40GB	60GB	80GB	100GB
Formatted capacity (GB)	37.26	55.89	74.52	93.15
Logical Blocks (LBA)	78,125,000	117,187,500	156,301,488	195,371,568
Rotational speed (rpm)	5400	5400	5400	5400
Toshiba HDD Buffer (MB)	16	16	16	16
Hitachi HDD Buffer (MB)	8	8	8	8
Fujitsu HDD Buffer (MB)	8	8	8	8
Bytes per sector	512	512	512	512

Table 1-1 2.5-inch SATA HDD specifications

Items	40GB	60GB	80GB	100GB
Formatted capacity (GB)	37.26	55.89	74.52	93.15
Logical Blocks (LBA)	78,125,000	117,187,500	156,301,488	195,371,568
Rotational speed (rpm)	4,200/5400	4,200/5400	4200/5400	4200/5400
Toshiba HDD Buffer (MB)	8/16	8/16	8/16	8/16
Hitachi HDD Buffer (MB)	2/8	8/8	8/8	8/8
Fujitsu HDD Buffer (MB)	8/8	8/8	8/8	8/8
Bytes per sector	512	512	512	512

Table 1-2 2.5-inch PATA HDD specifications

1.4 Optical device Drives

? DVD-ROM & CD-RW drive

? DVD Super Multi drive supporting ±R Double Layer

1.4.1 CD-RW & DVD-ROM

The combo drive accepts 12-cm (4.72-inch) and 8-cm (3.15-inch) discs. At maximum, the drive can play back a DVD at 8x speed, read CD-ROM at 24x speed, and write CD-R at 24x speed and CD-RW at 4x speed or High speed CD-RW at 10X or Ultra speed CD-RW at 24X speed.

The specifications of the DVD-ROM & CD-RW drive are listed in Table 1-3.

Item	DVD-ROM mode	CD-ROM mode
Data transfer rate (Mbytes/s)	33.3 (U-DMA transfer mode 2) 16.6 (PIO mode 4, Multiword DMA mode 2)	
Access time (ms) Average random access	180	150
Data buffer size (Mbytes)	2MB	
Formats supported	DVD: DVD-VIDEO, DVD-ROM, DVD-R (3.9G,4.7G), DVD-RW (Ver.1.1), DVD-RAM, DVD+R, DVD+RW, DVD+R DL, DVD-R DL. CD: CD-DA, CD-ROM Mode1, Mode2, , CD-R, CD-RW, CD-ROMXA Mode2 (Form1, Form2), Photo CD (single/multi-session), Enhanced CD (CD-EXTRA), CD-Text	

Table 1-3 DVD-ROM & CD-RW drive specifications

1.4.2 DVD Super Multi drive supporting ±R Double Layer

The DVD Super Multi drive accepts 12-cm (4.72-inch) and 8-cm (3.15-inch) discs. At maximum, the drive can play back a DVD at 8x speed, read CD-ROM at 24x speed, and write CD-R at 24x speed and CD-RW at 4x speed or Ultra and High speed CD-RW at 10x speed and DVD-R at 8x speed and DVD-RW at 4x speed and DVD+R at 8x speed and DVD+RW at 4x speed and DVD-RAM at 3x speed and DVD+R DL at 2.4x speed and DVD-R DL at 2x speed.

The specifications of the DVD Super Multi Double Layer drive are listed in Table 1-4

Item	DVD-ROM mode	CD-ROM mode
Data transfer rate (Mbytes/s)	33.3 (U-DMA transfer mode 2) 16.6 (PIO mode 4, Multiword DMA mode 2)	
Access time (ms) Average random access	180	150
Data buffer size (Mbytes)	2MB	
Formats supported	DVD: DVD-VIDEO, DVD-ROM, DVD-R (3.9G,4.7G), DVD-RW (Ver.1.1), DVD-RAM, DVD+R, DVD+RW, DVD+R DL, DVD-R DL CD: CD-DA, CD-ROM, CD-R, CD-RW, CD-ROMXA, PhotoCD (muitiSession), Video CD, CD-Extra (CD+), CD-Text	

Table 1-4 DVD Super Multi Double Layer drive specifications

1.5 Power Supply

This specification defines the performance and characteristic of 65W and 75W AC adapter power supply. It supplies a constant voltage 19V output source for M70 series notebook computer.

- ✍ A/D conversion
  - ? The EC uses 10-bit sampling for A/D conversion to determine the following values:
    - – Battery and temperature

- ✍ AC adaptor and battery check
  - ? The EC checks the following by A/D converted values:
    - – Battery installed
  - ? The EC checks the following by GPIO values:
    - – AC adaptor connected

- ✍ Abnormal check
  - ? The EC determines whether the condition is abnormal, and if so, stores an error code into the error register.

- ✍ Input port management
  - ? The EC monitors the following input signal status:
    - – System power ON/OFF status
    - – Direct CD power ON/OFF status

- ✍ Beep and LED control
  - ? Beep is caused by the low battery status.
  - ? The EC controls the following two kinds of LED
    - – DC IN LED (one color: green)
  - ? Green = indicates AC adaptor is connected
    - – Battery LED (two colors: orange and green)
  - ? Green solid = The battery is fully charged.
  - ? Orange = The computer is quick-charging the battery / The battery is low.

- ✍ Power ON/OFF sequence
  - ? When power is turned on or off, the EC starts the power on or off sequence.
    - – SQ0-4 = power ON sequence
    - – SQ5-B= power OFF sequence

- ✍ Battery charging control
  - ? The EC controls the following.
    - – The quick charging ON/OFF
    - – The detection of full charge

- ✍ Detection of the low battery
  - ? The EC detects the low battery point by the gas gauge.
    - – LB10M = The system will be driven by the battery for 12 more minutes.
    - – LB0 = The battery won't be able to drive the system after 3 minutes.
    - – LB1 = The battery can drive the system only during the suspend process.
    - – LB2 = The battery cannot drive the system.

- ✍ New battery installation
  - ? When a new battery is installed, the EC communicates with the E^2PROM in the battery to read information of the newly installed battery.

- ✍ Battery capacity calculation
  - ? The EC reads battery remaining and percentage capacity from the battery through SMBus.

1.6 Batteries

The computer has two types of battery:

- Main battery pack (18650 size)
- RTC battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached.

The battery specifications are listed in the table below.

Battery name	Material	Output voltage	Capacity
Main battery	Lithium-Ion	14.4V(8cell)	4300mAH
Main battery	Lithium-Ion	10.8V(6cell)	4000mAH
Main battery	Lithium-Ion	14.4V(4cell)	2000mAH
RTC battery	Lithium	3.0 V	15mAH

1.6.1 Main Battery

Battery charging is controlled by a power supply microprocessor that is mounted on the system board. The power supply microprocessor controls whether the charge is on or off and detects a full charge when the AC adaptor and battery are attached to the computer. The system charges the battery using quick charge or trickle charge.

✍ Quick Battery Charge

When the AC adaptor is attached, there are two types of quick charge: quick charge when the system is powered off and normal charge when the system is powered on.

The times required for charges are listed in the table below.

Status	Charging time
Normal charge (power on)	12 hours or longer
Quick charge (power off)	About 4 hours

NOTES

1. *The time required for normal charge is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.*
2. *Using quick charge, the power supply microprocessor automatically stops the charge after eight hours regardless of the condition of the battery. Overcharging could cause the battery to explode.*

If any of the following occurs, the battery quick charge process stops.

1. The battery becomes fully charged.
2. The AC adaptor or battery is removed.
3. The battery or output voltage is abnormal.
4. The battery temperature is abnormal.
5. The battery SMBus communication fails.
6. The battery cell is bad.

✍ Detection of full charge

A full charge is detected from the battery pack through SMBus when the battery is charging.

1.6.2 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. The table below lists the charging time and data preservation period of the RTC battery. The RTC battery is charged by the adaptor or main battery, while the computer is powered on.

Status	Time
Charging Time (power on)	About 24 hours
Data preservation period (full charge)	1 month

Chapter 2

Troubleshooting Procedures

Chapter 2 Contents

Figures

Tables

2.1 Troubleshooting Introduction

Chapter 2 describes how to determine if a Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. The FRUs covered are:

1. Display	6. TouchPad	11. IEEE 1394 port
2. USB Floppy Drive	7. Speaker	12. Wireless LAN system
3. Keyboard	8. Optical drive	13. Express card unit.
4. USB ports	9. Modem	14. Bluetooth
5. TV-out port	10. PCMCIA unit	

The Diagnostics Disk operations are described in Chapter 3. Detailed replacement procedures are given in Chapter 4.

The following tools are necessary for implementing the troubleshooting procedures:

1. Diagnostics Disk (Repair and Sound Repair)
2. Phillips screwdriver (2 mm)
3. 6mm nut driver (for the helix screw nuts on the rear ports for CPU door)
4. 2DD or 2HD formatted work disk for floppy disk drive testing
5. Sycard (PCMCIA test card)
6. Cleaning kit for floppy disk drive troubleshooting
7. Cleaning kit for optical drive troubleshooting
8. Multimeter
9. External monitor
10. USB compatible keyboard
11. Multimedia sound system with line-in and line-out ports
12. Headphones
13. USB test module and USB cable
14. Music CD

2.2 Troubleshooting Flowchart

If you know the location of the malfunction, turn directly to the appropriate section of this chapter. If the problem is unspecified, use the flowchart in Figure 2-1 as a guide for determining which troubleshooting procedures to execute. Before performing any troubleshooting procedures, verify the following:

- Ask the user if a password is registered and, if it is, ask him or her to enter the password.
- Verify with the customer that Toshiba Windows XP is installed on the hard disk. Operating systems that were not preinstalled by Toshiba can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the floppy disk drive, if installed, is empty. If no FDD module is installed, you should use an external FDD to run the diagnostics tests

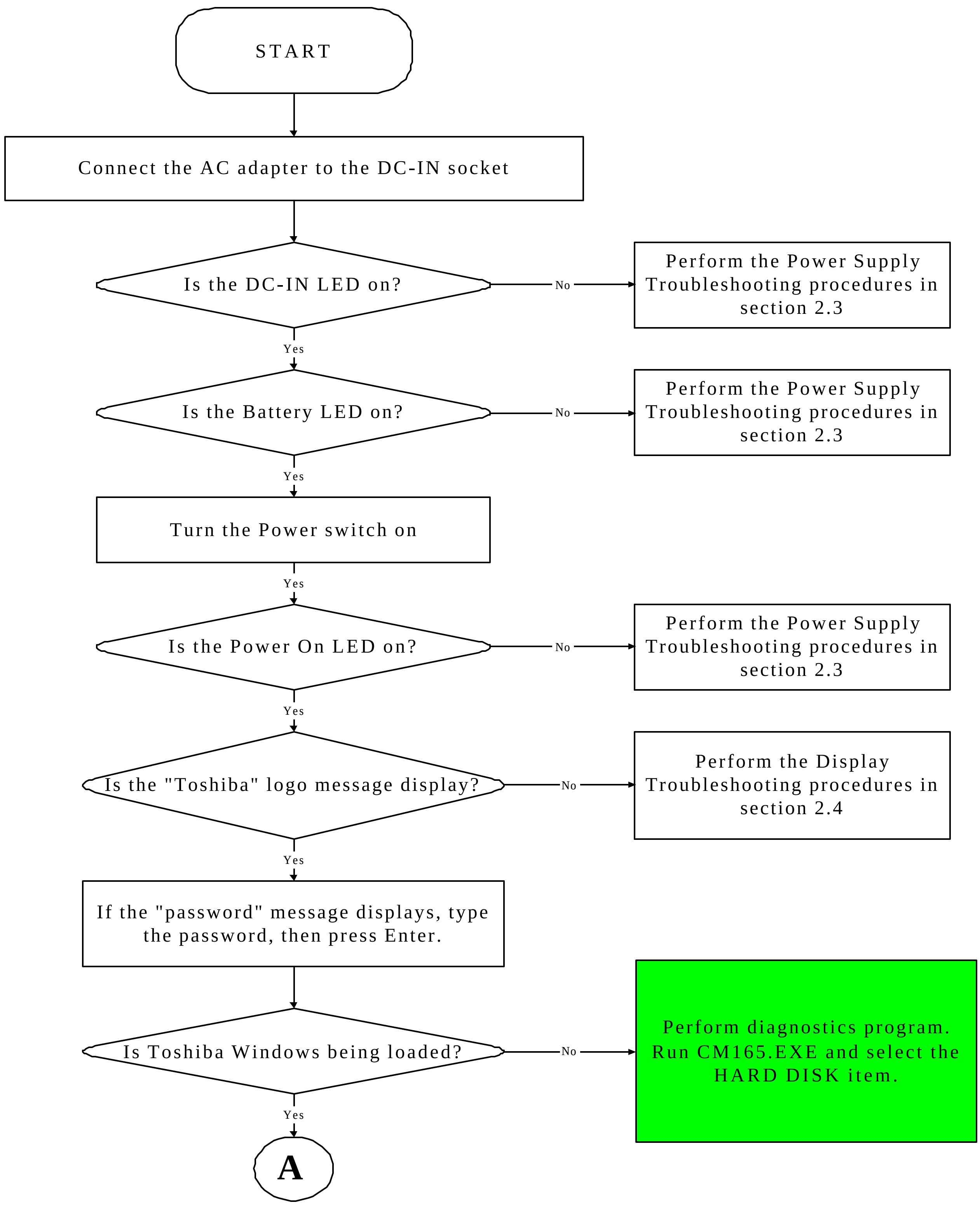


Figure 2-1 Troubleshooting flowchart (1/2)

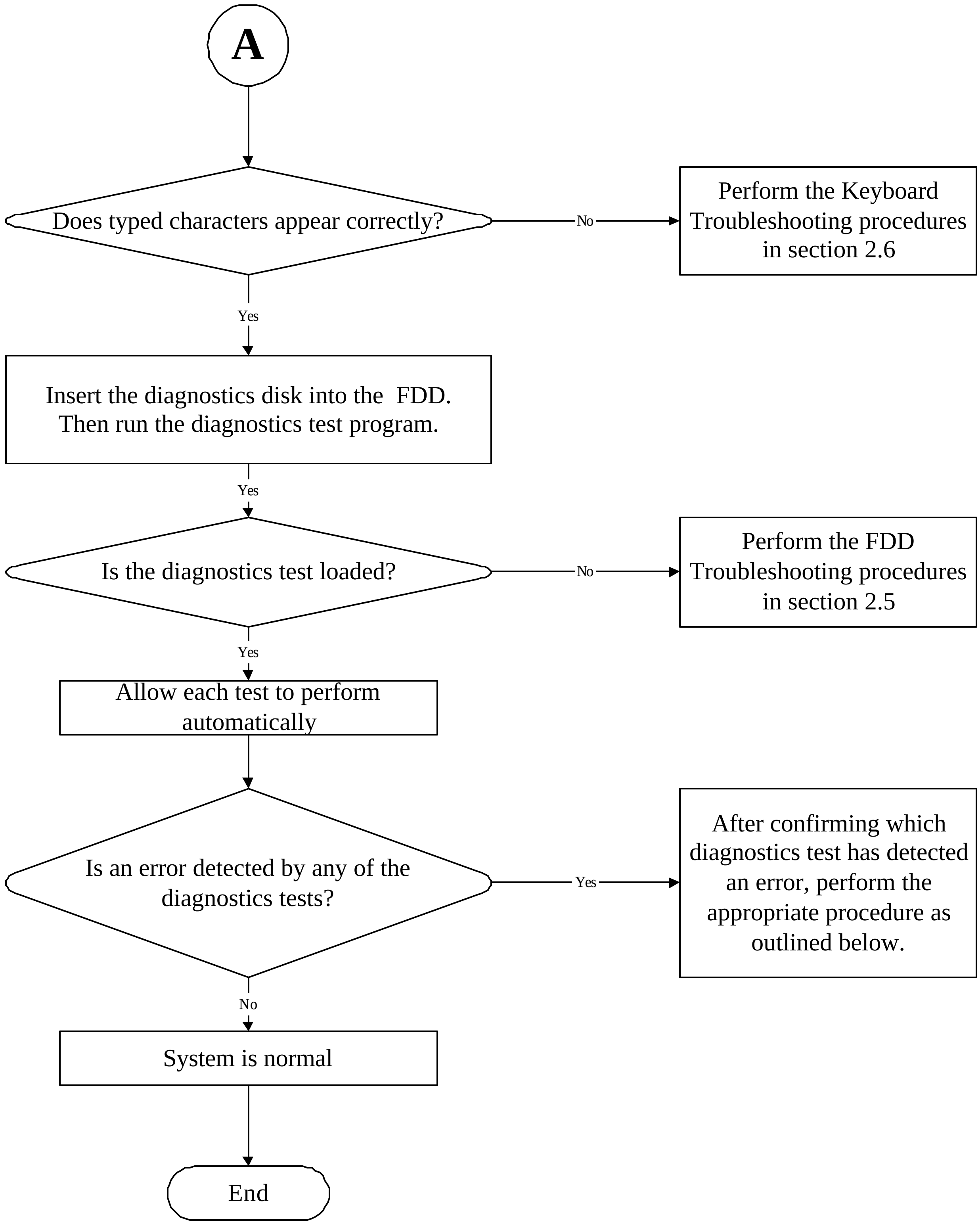


Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The test program should be executed several times to isolate the problem. When a problem has been located, perform the appropriate troubleshooting procedures as follows:

1. If an error is detected by the battery test, perform the Power Supply Troubleshooting procedures in Section 2.3.

2. If an error is detected by the display test, perform the Display Troubleshooting procedures in Section 2.4.

3. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting procedures in Section 2.5.

4. If an error is detected by the TouchPad test, perform the TouchPad Troubleshooting procedures in Section 2.8.

5. If an error is detected by the audio test, perform the Speaker Troubleshooting procedures in Section 2.9 and the Optical Drive Troubleshooting Procedures in Section 2.9.

6. If an error is detected by the modem test, perform the Modem Troubleshooting Procedures in Section 2.10.

Other problems that are not covered by the diagnostics program may be discovered by a user.

1. If an error is detected when using an external USB device, perform the External USB Devices Troubleshooting procedures in Section 2.6.

2. If an error is detected when using the TV-out connection, perform the TV-Out Failure Troubleshooting procedures in Section 2.7.

3. If an error is detected when using the speakers, perform the Speaker Troubleshooting procedures in Section 2.10.

4. If an error is detected when using the modem, perform the Modem Troubleshooting procedures in Section 2.12.

5. If an error is detected when using the PCMCIA unit, perform the PCMCIA Troubleshooting procedures in Section 2.13.

6. If an error is detected when using the IEEE1394 device, perform the IEEE1394 device Troubleshooting procedures in Section 2.14.

7. If an error is detected when using the Wireless LAN, perform the Wireless LAN Troubleshooting procedures in Section 2.15.

2.3 Power Supply Troubleshooting

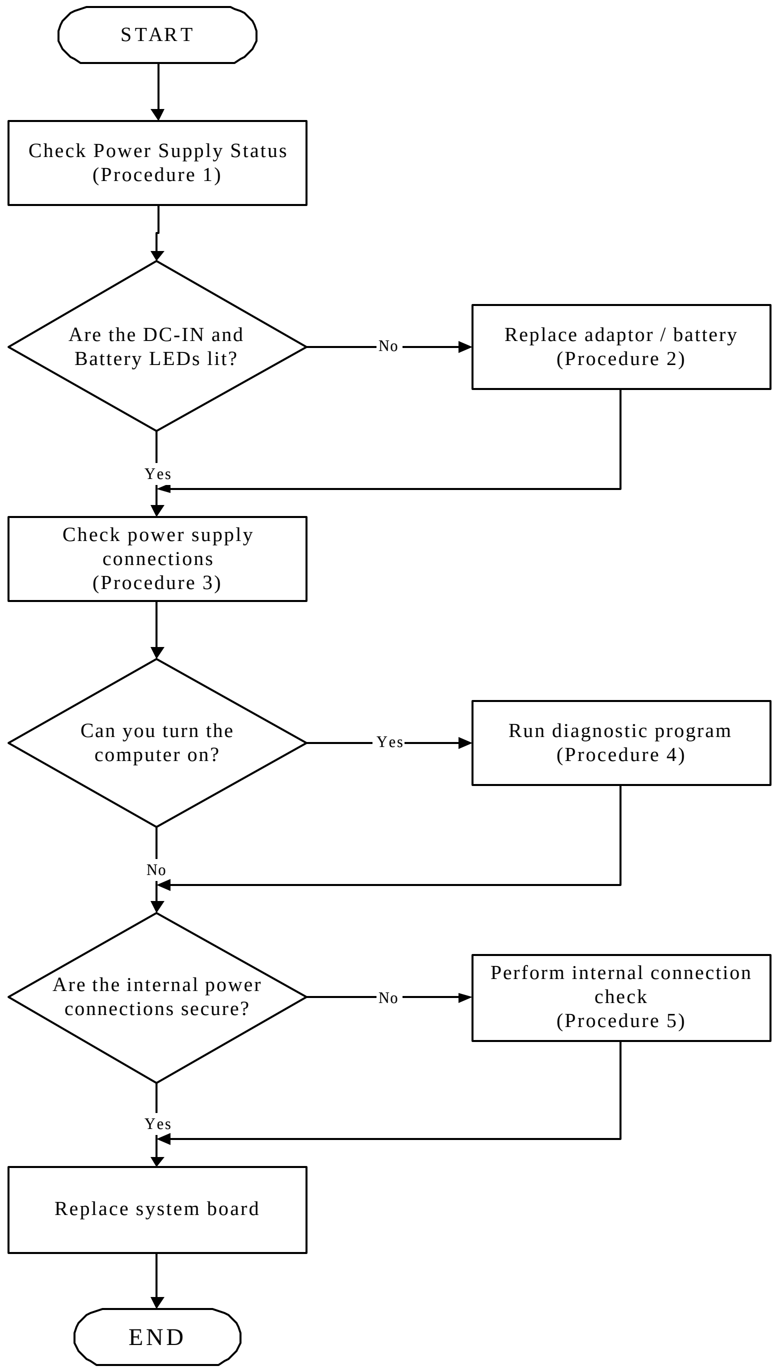


Figure 2-2 Power Supply Troubleshooting Process

The power supply controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The flowchart in Figure 2-2 gives a summary of the process. The procedures described in this section are:

Procedure 1: Power status check

Procedure 2: Adaptor / battery replacement

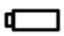
Procedure 3: Power supply connection check

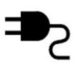
Procedure 4: Diagnostic check

Procedure 5: Internal connection check

Procedure 1 Power Status Check

The following LEDS indicate the power supply status:

 Battery LED

 DC-IN LED

The power supply controller displays the power supply status through the Battery and the DC-IN LEDS as listed in the tables below.

Table 2-1 Battery LED

Battery State	**LED colors**	**Definition**
Charging	Amber, solid on	Battery charging with AC .
	Green, solid on	Battery fully charged by AC
	Green color off	Battery abnormal stop charging with AC (Bad cell/ Overheated)
Discharging	Amber, blinking (LED on for 1 second every 4 seconds)	Battery within low state: 12 minutes remaining
	Amber, blinking (LED on for 1 second every 2 seconds)	Battery within critical low state: 3 minutes remaining. The system is protected and cannot be re-powered on without the AC power connected.
	Amber color off	Battery not in low or critical low state; It's in discharging state

Table 2-2 DC-IN LED

AC-IN LED	**Power supply status**
Solid on	AC power exists (LED is solid green).
Off	No AC power exists.

To check the power supply status, install a battery pack and connect an AC adaptor to the DC-IN port on the computer and to a power supply.

If the DC-IN LED or Battery LED is not lit, go to Procedure 2.

Procedure 2 Adaptor / battery replacement

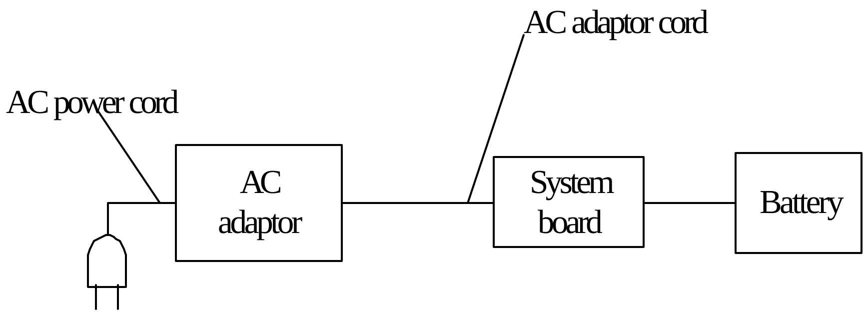
A faulty adaptor may not supply power or may not charge the battery. Perform Check 1.

Check 1 Connect a new AC adaptor. If the problem is not resolved, go to Check 2.

Check 2 Insert a new battery. If the problem is still not resolved, go to Procedure 3.

Procedure 3 Power supply connection check

The power supply wiring diagram is shown below:



Any of the connectors may be disconnected. Perform Check 1.

Check 1 Disconnect the AC power cord from wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.

Check 2 Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC-IN socket, AC adaptor inlet and wall outlet. If these cables are connected correctly, go to Check 3.

Check 3 Make sure that the DC-IN input port socket is firmly secured to the system board of the computer.

? If the DC-IN input socket is loose, go to Procedure 5.

? If it is not loose, go to Check 4.

Check 4 Use a multi-meter to make sure that the AC adaptor output voltage is close to 19 V. If the output is several percent lower than 19 V, go to Check 5. If the output is close to 19 V, go to Check 6.

Check 5 Connect a new AC adaptor or AC power cord.

? If the DC-IN LED does not light, go to Procedure 4.

? If the battery LED does not light, go to Check 6.

Check 6 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery LED still does not light, go to Procedure 4.

Procedure 4 Diagnostic check

The power supply may not charge the battery pack. Perform the following procedures:

1. Reinstall the battery pack.
2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.
3. Run the Diagnostic test following the procedures described in Chapter 3, Tests and Diagnostics. If no problem is detected, the battery is functioning normally.

Procedure 5 Replacement check

The system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. Check the connection between the AC adaptor and the system board. After checking the connection, perform Check 1:

Check 1 Use a multi-meter to make sure that the fuses on the system board are not blown. If a fuse is not blown, go to Check 2. If a fuse is blown, go to Check 3.

Check 2 Make sure that the battery cable is firmly connected to the system board. If it is connected firmly, go to Check 3.

Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.4 Display Troubleshooting

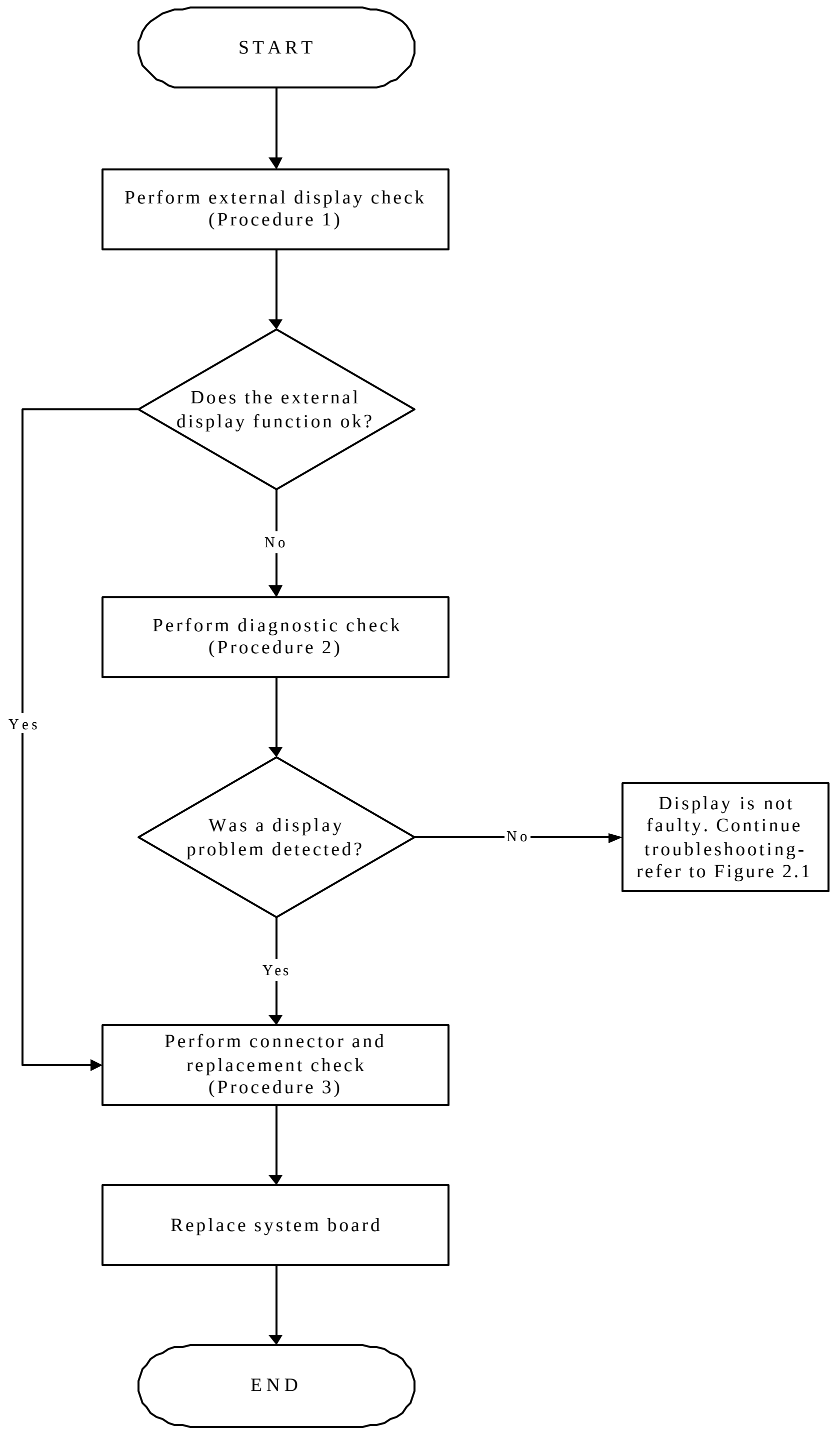


Figure 2-3 Display troubleshooting process

This section describes how to determine if the computer's display is functioning properly. The process is outlined in Figure 2-3. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: External display check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

Procedure 1 External display check

Connect an external display to the computer's external monitor port, then boot the computer. The computer automatically detects the external display.

If the external display works correctly, the internal LCD may be damaged. Go to Procedure 3.

If the external monitor appears to have the same problem as the internal monitor, the system board may be damaged. Go to Procedure 2.

Procedure 2 Diagnostic check

The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details.

If an error is detected, go to Procedure 3. If an error is not detected, the display is functioning properly.

Procedure 3 Connector and replacement check

The FL inverter board, LCD module, and system board are connected to the display circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

Check 1 Make sure the DDR RAM module is seated properly. Test display again. If the problem still exits, replace the DDR RAM module. If the problem still exists, perform Check 2.

Check 2 Replace the FL inverter board with a new one and test display again. If the problem still exists, perform Check 3.

Check 3 Replace the LCD module with a new one and test display again. If the problem still exists, perform Check 4.

Check 4 Replace the LCD/FL cable with a new one and test display again. If the problem still exists, perform Check 5.

Check 5 Replace the CPU with another of the same specifications. If the problem still exists, perform Check 6.

Check 6 The system board may be damaged. Replace it with a new one.

2.5 Keyboard Troubleshooting

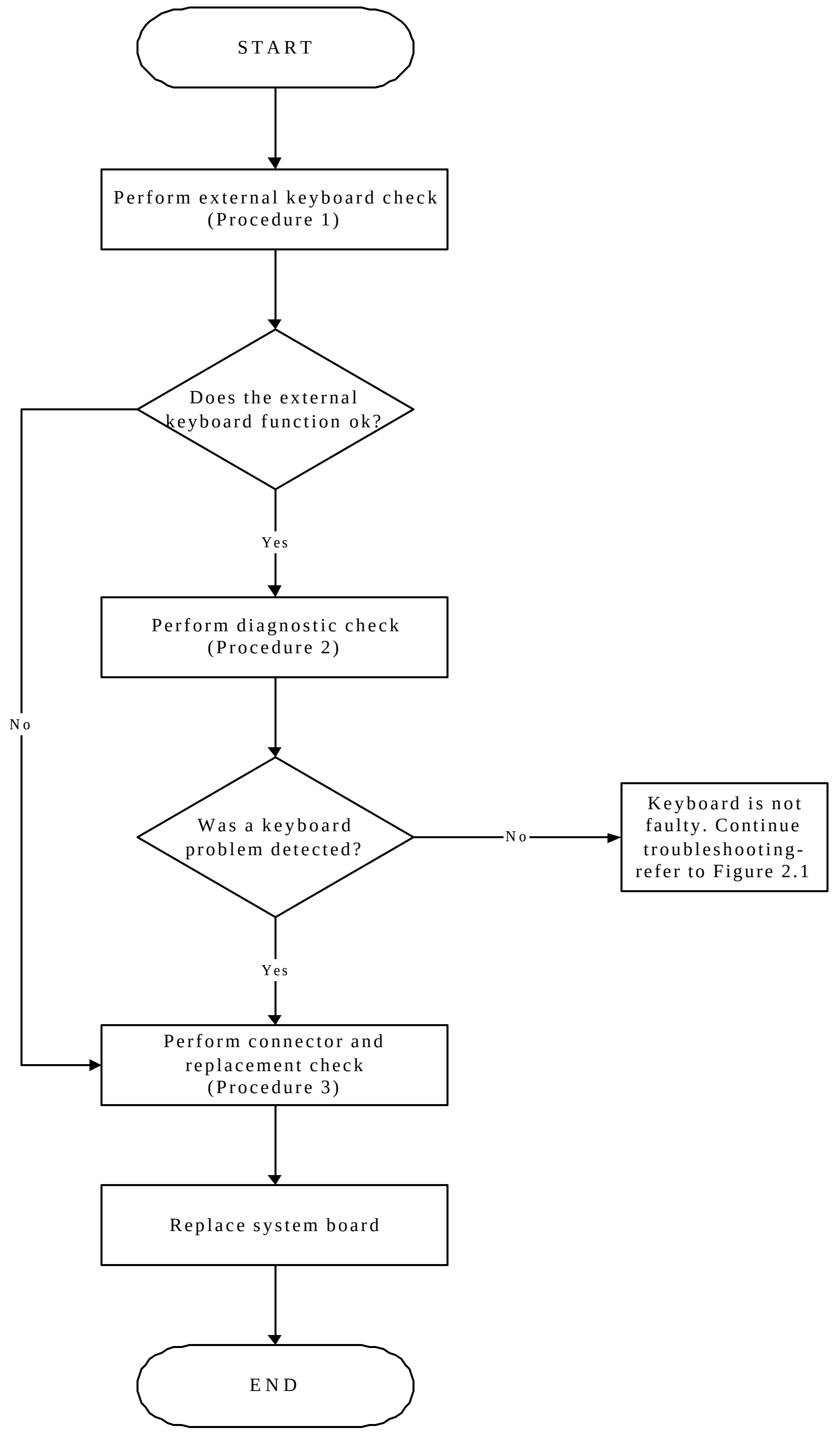


Figure 2-4 Keyboard troubleshooting process

To determine if the computer's keyboard is functioning properly, perform the following procedures. Figure 2-5 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: External keyboard check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

Procedure 1 External keyboard check

Connect a USB keyboard to one of the computer's USB ports, then boot the computer. The computer automatically detects the external keyboard.

If the external keyboard works correctly, the internal keyboard or its connections may be faulty. Go to Procedure 2.

If the external keyboard appears to have the same problem as the internal keyboard, the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

Procedure 2 Diagnostic check

Run the Diagnostic Program, which will automatically execute the Keyboard Test. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to run the program.

If an error is located, go to Procedure 3. If an error does not occur, the keyboard is functioning properly.

Procedure 3 Connector and replacement check

The keyboard and/or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks.

Check 1 Make sure the keyboard cable is firmly connected to the system board.

If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2 The keyboard may be damaged. Replace it with a new one following the instructions in Chapter 4.

If the problem still exists, perform Check 3.

Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.6 External USB Devices Troubleshooting

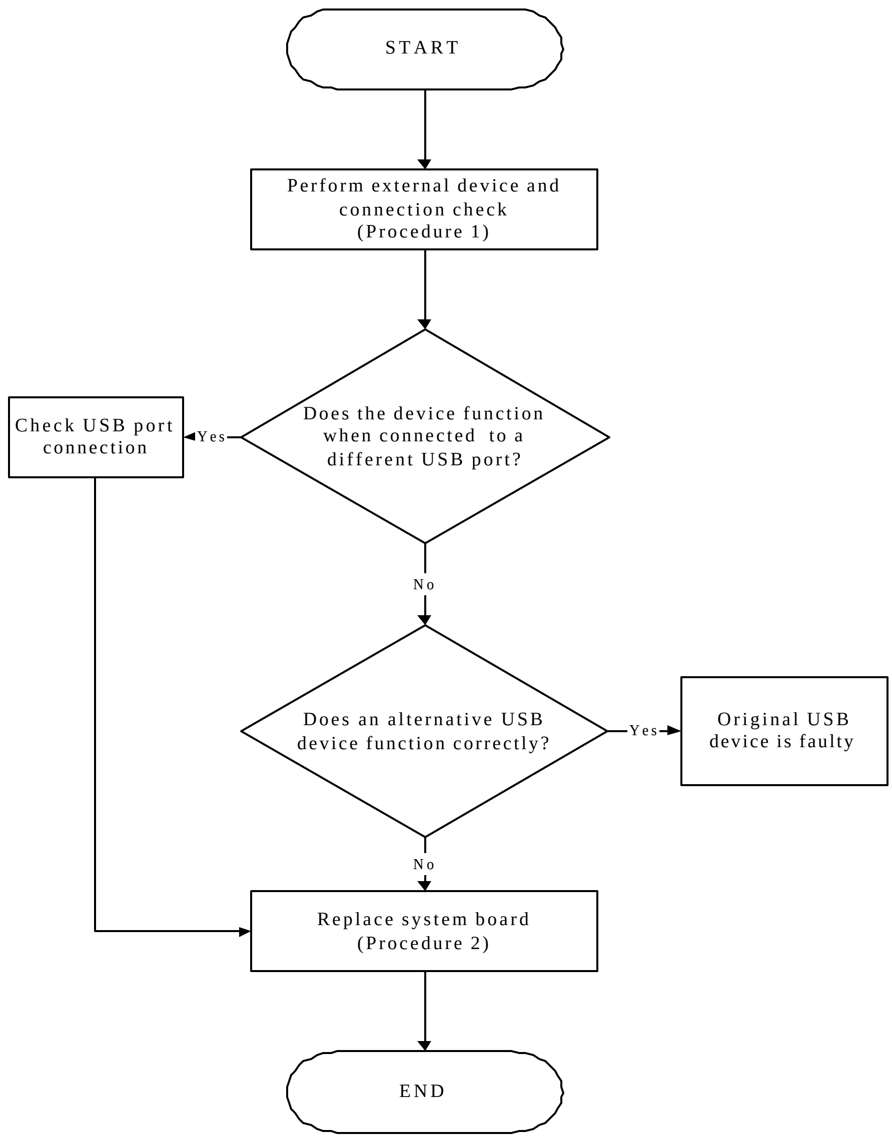


Figure 2-5 External USB device troubleshooting process

To determine if the computer's external USB devices are functioning properly, perform the following procedures. Figure 2-6 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: External device and connection check

Procedure 2: Replace system board

Procedure 1 External device and connection check

The USB device may be damaged or the connection may be faulty. Perform Check 1.

Check 1 Make sure USB device cable is firmly plugged into one of the USB sockets. If the cable is connected correctly, go to Check 2.

Check 2 Plug the USB device into another USB socket (there are three in all). If the USB device still does not work, go to Check 4.

If the device functions correctly when connected to another USB port, go to Check 3.

Check 3 Make sure that the USB socket is firmly secured to the system board of the computer. If the malfunction remains, the system board may be damaged. Go to Procedure 2.

Check 4 Connect an alternative USB device to one of the computer's USB ports, and then boot the computer. The computer automatically detects the external device.

If the alternative USB device works correctly, the original device may be damaged and should be replaced.

If the alternative USB device appears to have the same problem as the original device, the system board may be damaged. Go to Procedure 2.

Procedure 2 Replace system board

If the error persists, the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.7 TV-Out Failure Troubleshooting

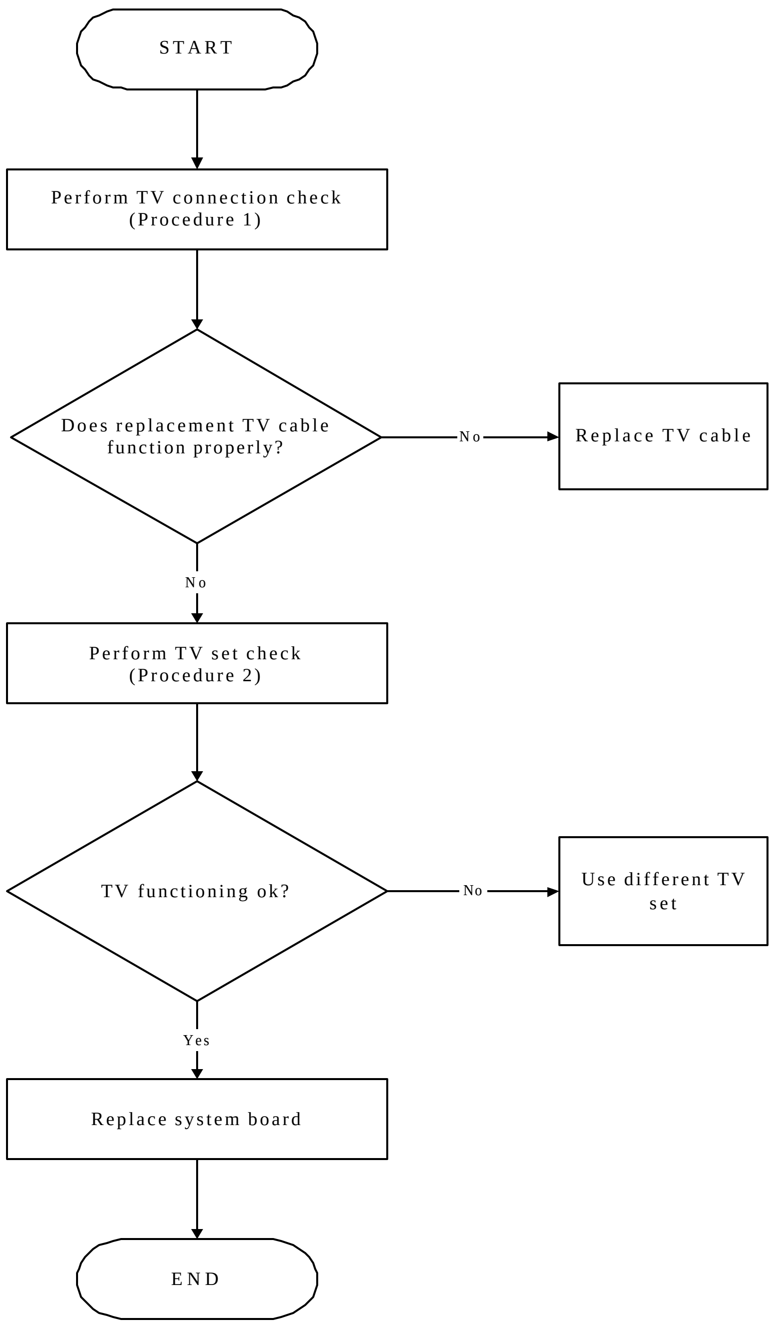


Figure 2-6 TV-out troubleshooting process

To determine if the computer's TV-out port is functioning properly, perform the following procedures. Figure 2-7 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: TV connection check

Procedure 2: TV set check

Procedure 1 TV connection check

The TV cable may be damaged or the connections may be loose. Perform Check 1:

Check 1 Make sure TV cable is firmly plugged into both the TV set and the TV-out port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the TV-out port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.

Check 3 The TV cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2.

Procedure 2 TV set check

The TV set may be faulty. Perform Check 1:

Check 1 Try using the set for television reception. If it does not work, the set may be damaged. If the set does work, perform Check 2.

Check 2 Try connecting a different television to the computer. If the replacement television works, the original set may be damaged. If the replacement set does not work the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.8 TouchPad Troubleshooting

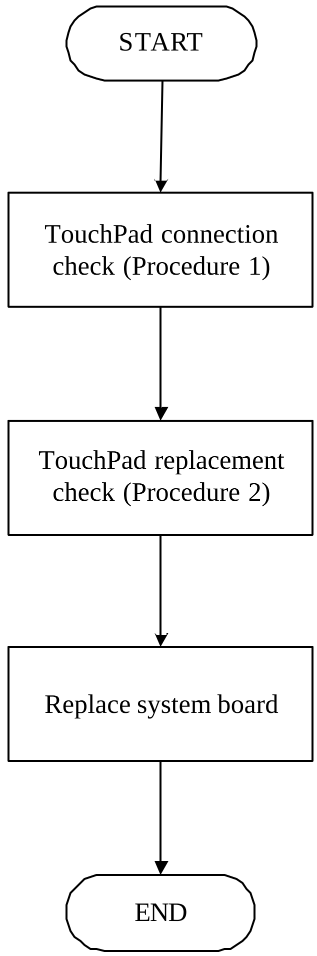


Figure 2-7 TouchPad troubleshooting process

To determine if the computer's built-in TouchPad is functioning properly, perform the following procedures. Figure 2-9 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: TouchPad connection check

Procedure 2: TouchPad replacement check

Procedure 1 TouchPad connection check

The TouchPad is connected via the TouchPad FPC to the system board. Make sure the TouchPad FPC cable is firmly connected to the TouchPad and system board. Refer to Chapter 4, *Replacement Procedures,* for instructions on how to disassemble the computer and then perform the following checks.

If any of the connections are loose, reconnect firmly. If any of the connections is damaged, or there is still an error, go to Procedure 2.

Procedure 2 TouchPad replacement check

The TouchPad unit or FPC may be defective or damaged. Replace each with a new one following the steps in Chapter 4. If the FDD is still not functioning properly, replace the system board with a new one following the steps in Chapter 4.

2.9 Speaker Troubleshooting

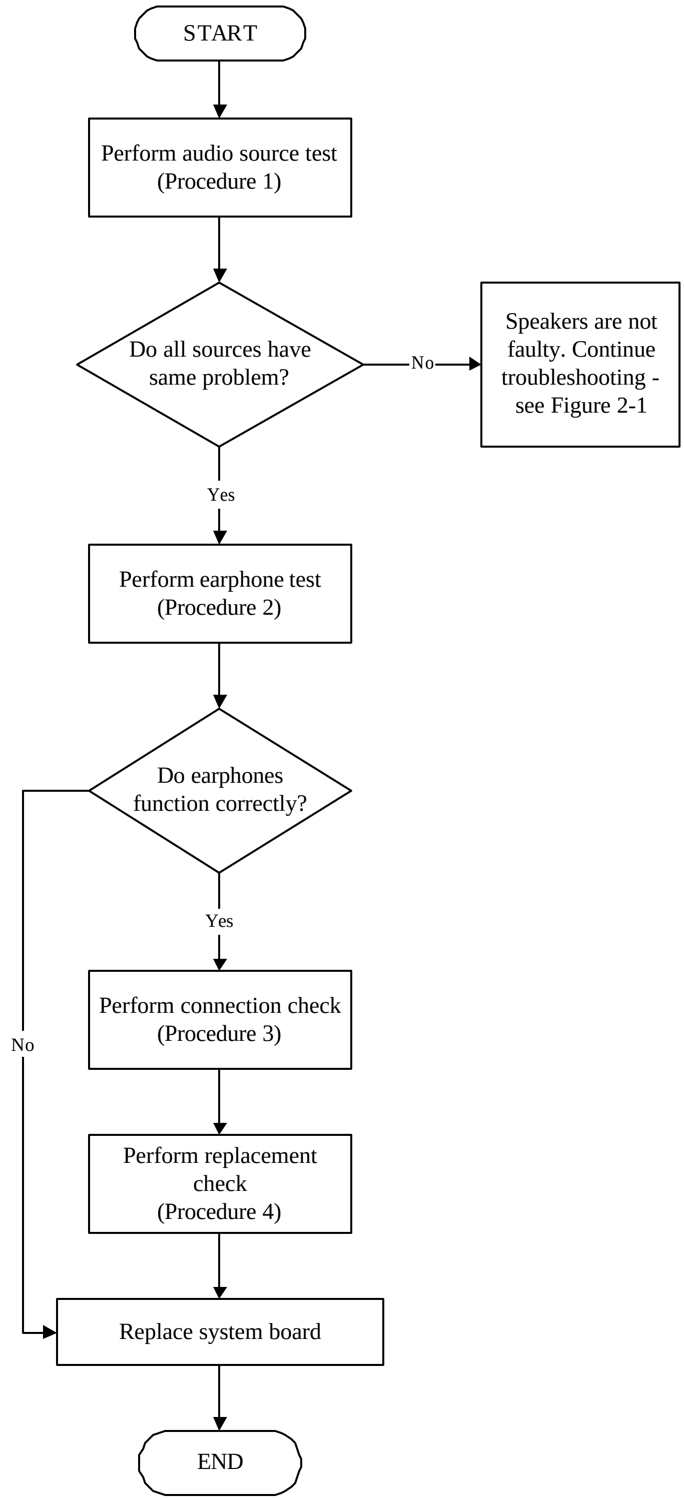


Figure 2-8 Speaker troubleshooting process

To determine if the computer's built-in speakers are functioning properly, perform the following procedures. Figure 2-10 outlines the process. First adjust the speaker volume to an appropriate level. Start with Procedure 1 and continue as instructed.

Procedure 1: Audio source test

Procedure 2: Earphone test

Procedure 3: Connection check

Procedure 4: Replacement check

Procedure 1 Audio source test

Try different audio sources (e.g. an audio CD and digital music file) to determine whether the fault is in the speaker system or not. If not all sources have sound problem, the problem is in the source devices. If all have the same problem, continue with Procedure 2.

Procedure 2 Earphone test

Connect a set if earphones or external speakers. If these function correctly, go to Procedure 3. If they do not function correctly, the system board may be defective or damaged. Replace it with a new one.

Procedure 3 Connection check

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and make sure the speaker cable is firmly connected to the audio board. If the stereo speakers are still not functioning properly, go to Procedure 4.

Procedure 4 Replacement check

If the stereo speakers don't sound properly, the stereo speakers may be defective or damaged. Replace them with new ones. If the stereo speakers still do not work properly, try replacing in turn the audio board and system board.

2.10 Optical Drive Troubleshooting

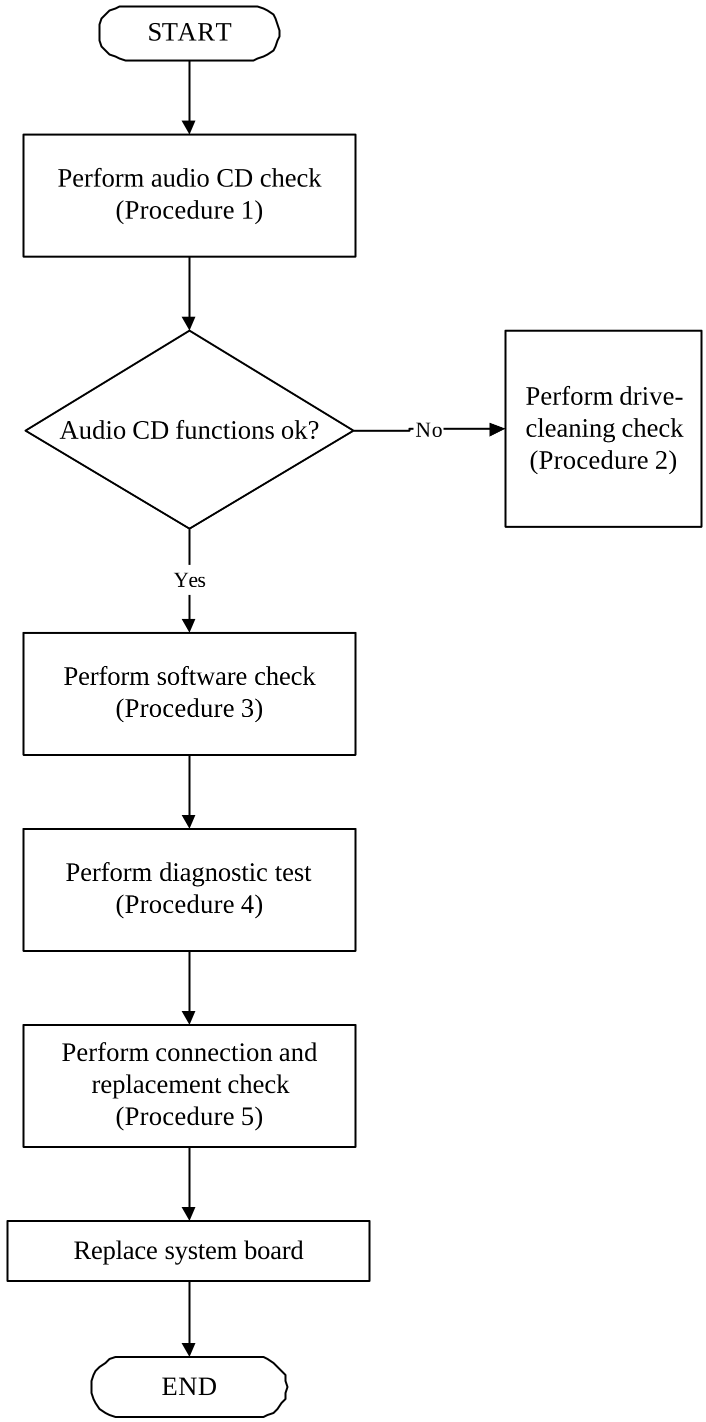


Figure 2-9 Optical drive troubleshooting process

This section describes how to determine if the computer's internal optical drive is functioning properly. The Satellite M70 module bays can accommodate the following optical drives:

? DVD SuperMulti supporting +-R Double Rayer
? COMBO device

Figure 2-11 outlines the process. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Audio CD test
Procedure 2: Drive cleaning check
Procedure 3: Software check
Procedure 4: Diagnostic test
Procedure 5: Connection and replacement check

Procedure 1 Audio CD check

First, insert an audio CD into the CD/DVD drive. If it works, the problem is not with the drive. Go to Procedure 3. If the audio CD does not work, go to Procedure 2. If the CD/DVD LED on the front panel does not light when the disc is played and the drive gives no response, go straight to Procedure 3.

Procedure 2 Drive cleaning check

Insert a CD/DVD drive-cleaning disk into the drive clean according to the drive-cleaning product instructions. If the problem persists, go to Procedure 3.

Procedure 3 Software check

Ensure that the appropriate driver has been installed on the computer for the CD/DVD drive.

Procedure 4 Diagnostic test

The audio test program stored in the Diagnostics Disk will test the drive's ability to play an audio CD. See Chapter 3 for details.
If any errors occur while executing the diagnostic program, go to Procedure 5.

Procedure 5 Connection check and replacement check

The optical drive connects to the system board. The drive may be disconnected, or the drive or system board may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1 Make sure the drive is firmly connected to the system board. If the connection is good and there is still an error, go to Check 2.

Check 2 The drive or drive cable may be defective or damaged. Replace each with a new one following the steps in Chapter 4, *Replacement Procedures*. If the drive is still not functioning properly, perform Check 3.

Check 3 The system board may be damaged. Replace it with new one following the instructions in Chapter 4, Replacement Procedures.

2.11 Modem Troubleshooting

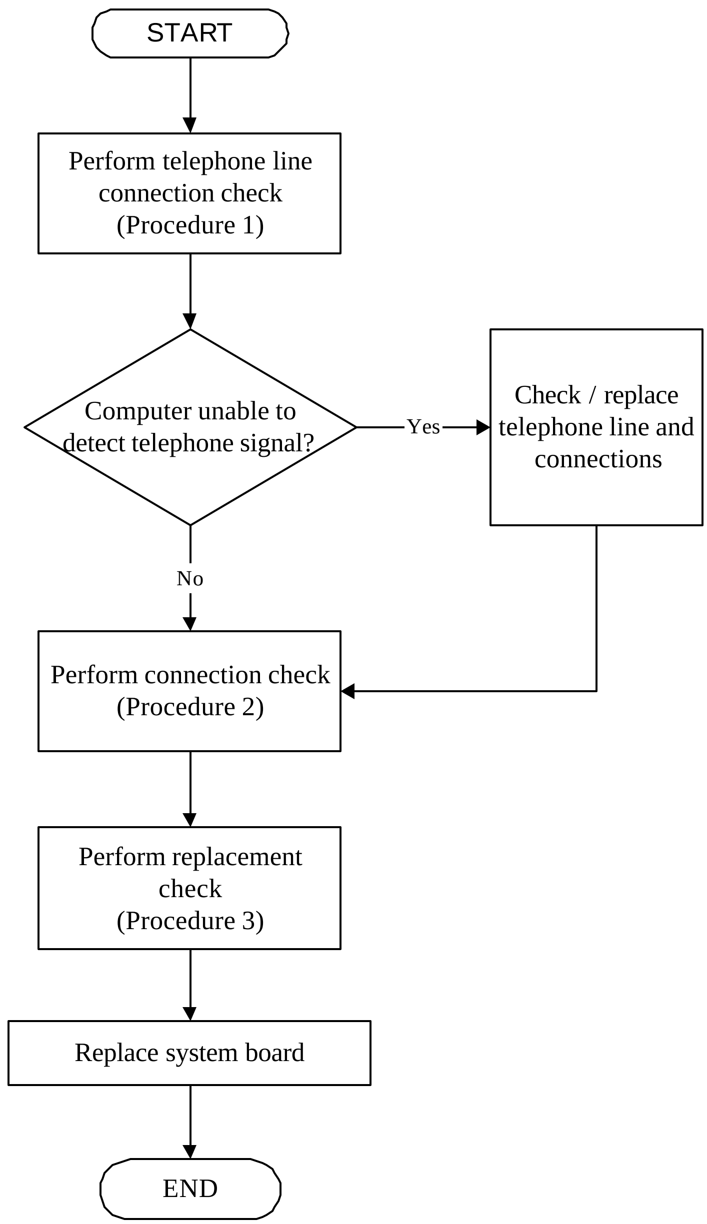


Figure 2-10 Modem troubleshooting process

This section describes how to determine if the computer's modem is functioning properly. Figure 2-12 outlines the process. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Telephone line connection check

Procedure 2: Modem card connection check

Procedure 3: Modem card replacement check

Procedure 1 Telephone line connection check

The telephone cable may be damaged or the connections may be loose. Attempt to connect the computer to a network through using the modem. If the modem does not function at all, go to Procedure 3. If the attempt fails because the computer detects no telephone signal, the fault may be in the telephone cable, the wall socket or the modem port. Perform Check 1:

Check 1 Make sure telephone cable is firmly plugged into both the telephone wall socket and the modem port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the modem port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.

Check 3 The telephone cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2.

Procedure 2 Modem card connection check

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and ensure that the modem card is well connected to the system board. If the problem persists, perform Procedure 3.

Procedure 3 Modem replacement check

The modem card or RJ-11 jack may be faulty. Try replacing them. If the problem persists, the system board may be defective or damaged. Replace the System Board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.12 PCMCIA Troubleshooting

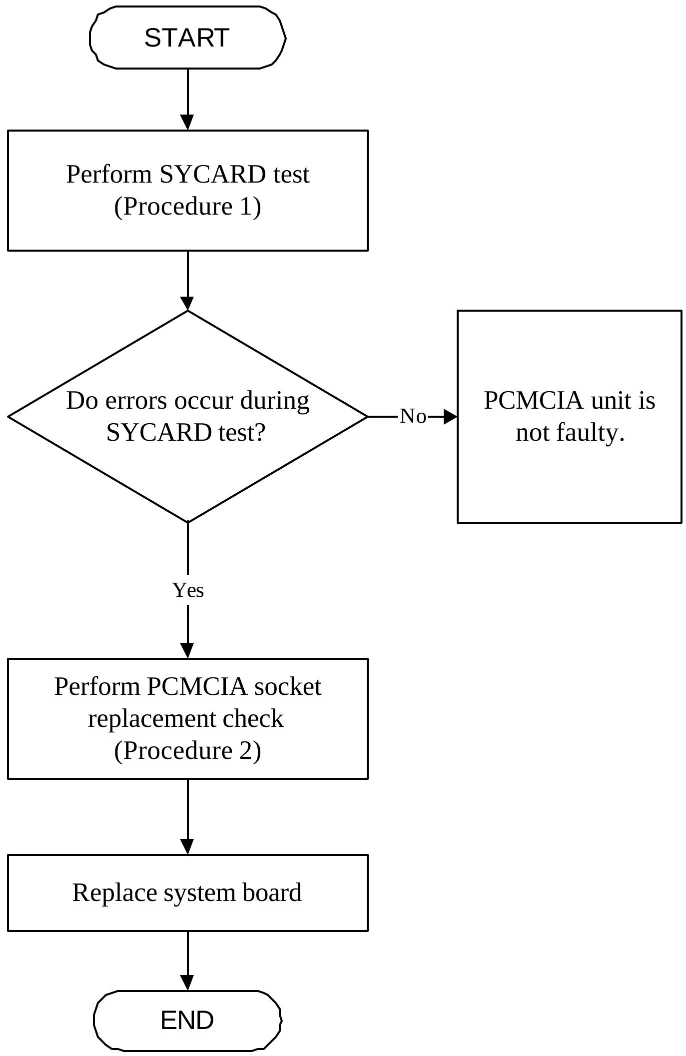


Figure 2-11 PCMCIA troubleshooting process

This section describes how to determine if the PCMCIA card player is functioning properly. The process is summarized in Figure 2-13. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Sycard test

Procedure 2: PCMCIA socket replacement check

Procedure 1 SYCARD test

The SYCARD test card contains a PCMCIA test program. Ensure the card in fully inserted into the socket before running the program.
If an error occurs during the SYCARD test, perform Procedure 2. If no error occurs, it is likely that the original PC card was faulty.

Procedure 2 PCMCIA socket replacement check

The PCMCIA socket may be damaged or defective, for instance the socket pins can be bent. Disassemble the computer following the steps described in Chapter 4, Replacement Procedures and replace the socket. If the problem persists, the system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4.

2.13 IEEE 1394 Troubleshooting

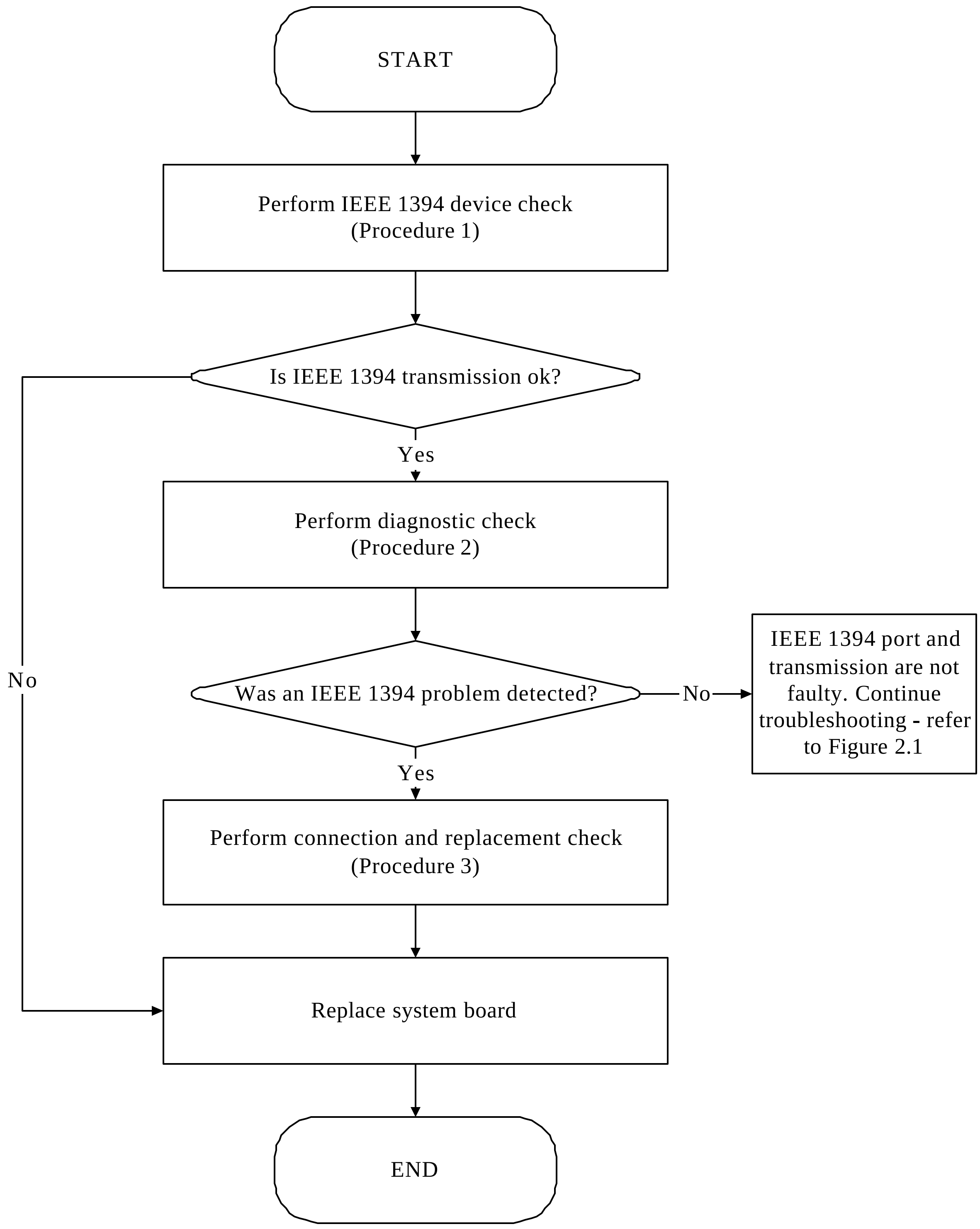


Figure 2-12 IEEE 1394 troubleshooting process

To determine if the computer's IEEE 1394 system is functioning properly, perform the following procedures. Figure 2-14 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: IEEE 1394 device check

Procedure 2: Diagnostic check

Procedure 3: Connection and replacement check

Procedure 1 IEEE 1394 device check

Connect an IEEE 1394 device to the computer's IEEE 1394 port, then boot the computer for Windows XP. The computer should automatically detect the 1394 device. Check whether the device can transmit data to the computer.
If the device is able to communicate with the computer, the problem may be intermittent or connections may be faulty. Go to Procedure 2.
If communication is impaired, there may be a faulty connection. Go to Procedure 3.

Procedure 2 Diagnostic check

Run the Diagnostic Program, which will automatically execute the IEEE 1394 port test for transmission. Refer to Chapter 3, Tests and Diagnostics for more information on how to run the program.
If an error is located, go to Procedure 3. If an error does not occur, the 1394 port is functioning properly.

Procedure 3 Connection and replacement check

The transmission cable may be damaged or the connections may be loose. Perform Check 1:

Check 1 Make sure the transmission cable is firmly plugged into both the IEEE 1394-compatible device and the IEEE 1394 port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the IEEE 1394 port is firmly secured to the system board of the computer. If the malfunction persists, go to Check 3.

Check 3 The transmission cable may be damaged. Replace with a good cable. If the malfunction persists, go to Check 4

Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.14 Wireless LAN Troubleshooting

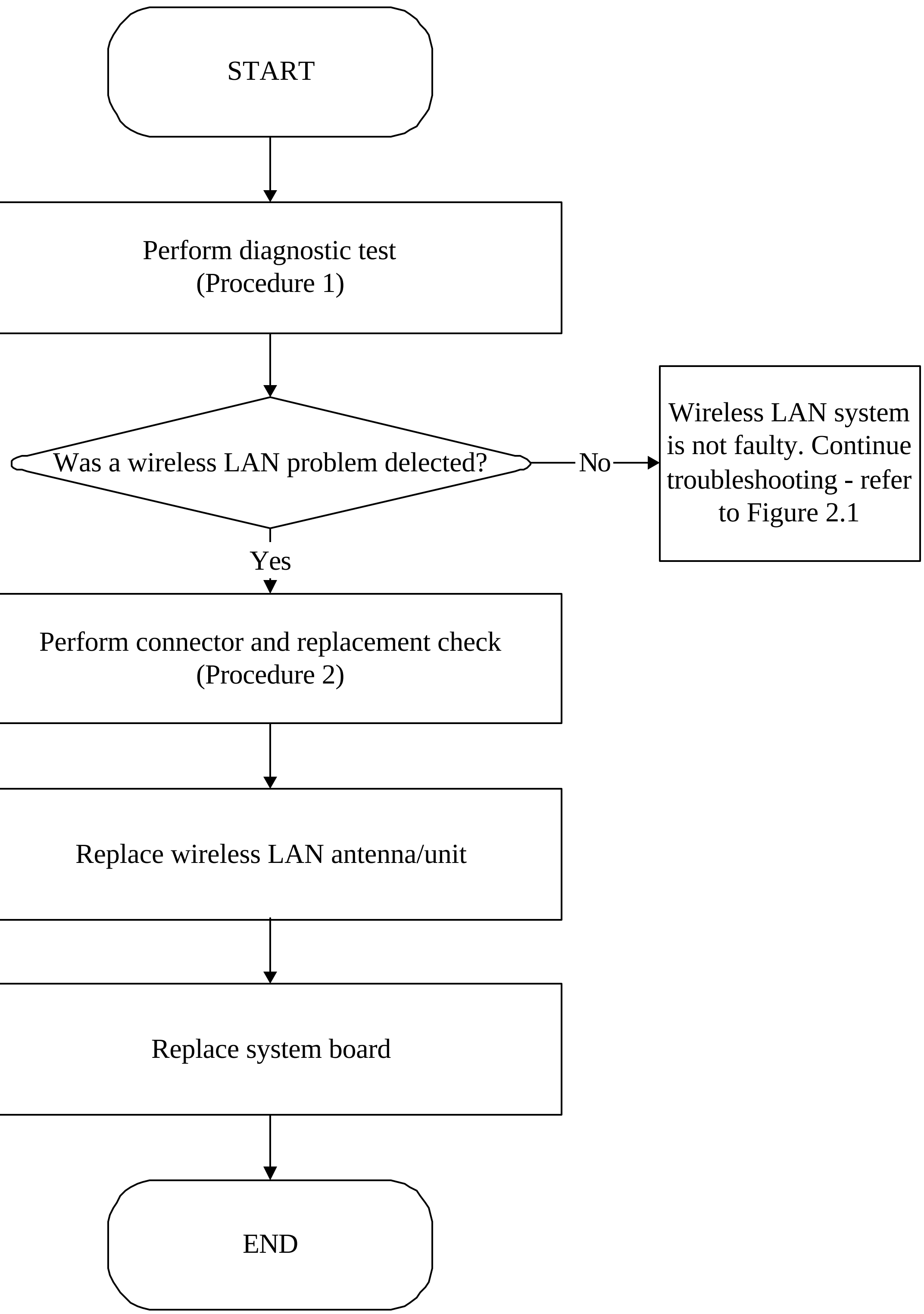


Figure 2-13 Wireless LAN troubleshooting process

The wireless LAN antenna wire, wireless LAN unit or system board may each be the source of a wireless LAN fault. Any of these components may be damaged. To determine if the computer's wireless LAN system is functioning properly, perform the following procedures. Figure 2-15 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

Procedure 1 Diagnostic test

Run the Diagnostic Program, which will automatically execute the wireless LAN test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.
If an error is located, go to Procedure 2. If an error is not located, the wireless LAN system is functioning properly.

Procedure 2 Connector and replacement check

The wireless LAN antenna, wireless LAN unit or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

Check 1 Make sure that the wireless LAN antenna is firmly connected to the wireless LAN unit (refer to Chapter 4 for instructions) and that the wireless LAN unit is securely slotted into the system board. If the problem persists, go to Check 2.

Check 2 Check that the wireless communication switch is turned to "On", then make sure that the wireless communication LED on the front panel is lit. If the LED is lit but the wireless LAN function is still faulty, the antenna may be damaged. Replace with a new antenna following the steps in Chapter 4, *Replacement Procedures*. If the problem persists, or if the wireless LAN LED is not lit when the wireless communication switch is turned to "On", go to Check 3.

Check 3 The wireless LAN unit may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 4.

Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.15 Express Card Troubleshooting

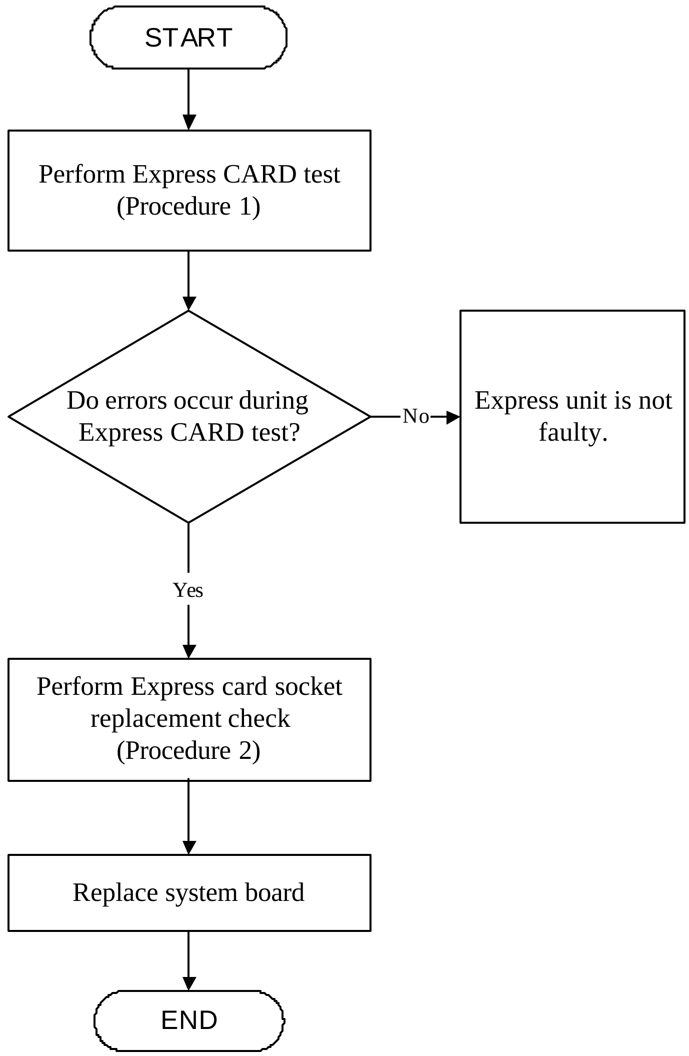


Figure 2-14 Express card troubleshooting process

This section describes how to determine if the Express card player is functioning properly. The process is summarized in Figure 2-14. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Express card test

Procedure 2: Express socket replacement check

Procedure 1 Express card test

The Express test card contains a Express test program. Ensure the card in fully inserted into the socket before running the program.
If an error occurs during the Express card test, perform Procedure 2. If no error occurs, it is likely that the original Express card was faulty.

Procedure 2 Express card socket replacement check

The Express card socket may be damaged or defective, for instance the socket pins can be bent. Disassemble the computer following the steps described in Chapter 4, Replacement Procedures and replace the socket. If the problem persists, the system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4.

2.12 Bluetooth Troubleshooting

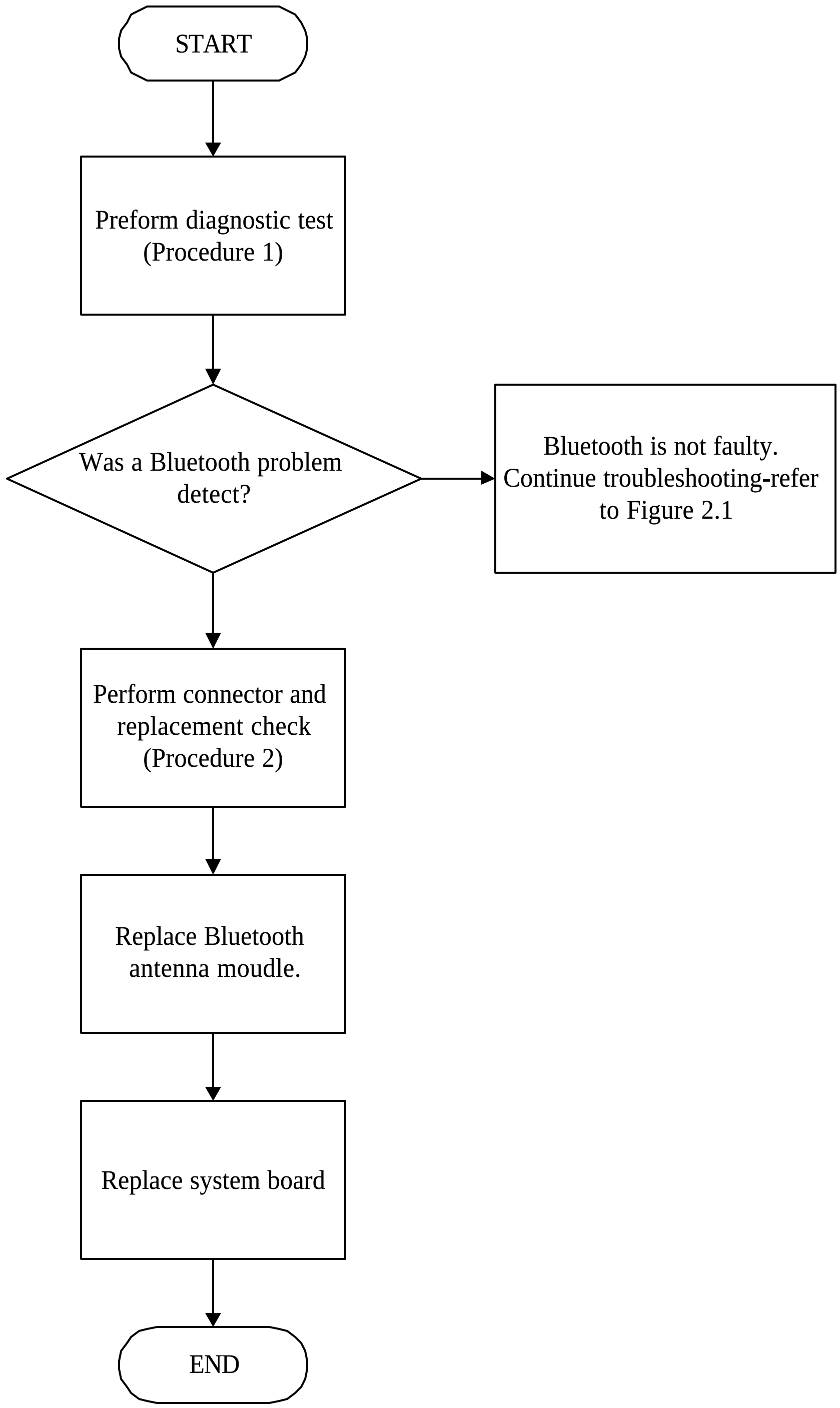


Figure 2-16 Bluetooth troubleshooting process

The Bluetooth antenna wire, Bluetooth module or system board may be the reason of a Bluetooth fault. Any of these components may be damaged. To determine if the computer's Bluetooth is functioning properly, perform the following procedures. Figure 2-16 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

Procedure 1 Diagnostic test

Run the Diagnostic Program, which will automatically execute the Bluetooth test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.
If an error is located, go to Procedure 2. If an error is not located, the Bluetooth system is functioning properly.

Procedure 2 Connector and replacement check

The Bluetooth, antenna module or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

Check 1 Make sure that the Bluetooth antenna is firmly connected to the Bluetooth module (refer to Chapter 4 for instructions) and that the Bluetooth FFC is securely slotted into the system board. If the problem persists, go to Check 2.

Check 2 Check that the Bluetooth communication switch is turned to "On", then make sure that the communication LED on the left panel is lit. If the LED is lit but the Bluetooth function is still faulty, the antenna module may be damaged. Replace with a new antenna following the steps in Chapter 4, *Replacement Procedures*. If the problem persists, or if the Bluetooth communication LED is not lit when the Bluetooth communication switch is turned to "On", go to Check 3.

Check 3 The Bluetooth module may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 4.

Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

Chapter 3

Tests and Diagnostics

Contents

3.1 The Diagnostic Test

This chapter explains how to use the Test & Diagnostic program to test the functions of the **(Base on Detroit10 T&D version 1.0)** hardware modules. The Test & Diagnostic Program is stored on the T&D diskettes. The program consists of a series of tests that run automatically when the Diagnostics Program items are selected and executed.

> ***NOTES:*** *To start the diagnostics, follow these steps*
>
> 1. *Check all cables for loose connections.*
> 2. *Exit this program when you are at Main Menu.*

The TEST & DIAGNOSTIC PROGRAM contains the following functional tests:

- CONFIG CHECK TEST
- DMI CHECK TEST
- SPEAKER AUDIO TEST
- FAN ON/OFF TEST
- MAIN BATTERY CHARGE TEST
- FDD TEST
- ODD TEST
- KEYBOARD TEST
- MOUSE(PAD) TEST
- LCD PIXELS MODE TEST
- MAGNETIC SWITCH TEST
- HDD R/W TEST
- LAN TEST
- RTC TEST
- IEEE1394 CODE TEST
- Speaker EQ Check&Rewrite
- Button Test

You will need the following equipment to perform some of the Diagnostic test programs.

- The diagnostics diskette (2 pcs)
- A formatted working diskette for the floppy disk drive test (Floppy Disk Drive Test)
- A data CD disc (ODD Test)
- A LAN loopback connector (LAN Test)

The following sections explain how to execute the Test & Diagnostic Program and detail the tests within the program.

3.2 Executing the Diagnostic Test

Toshiba MS-DOS is required to run the DIAGNOSTICS PROGRAM. To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the diagnostics diskette #1 in the floppy disk drive and turn on the computer. (The diagnostics diskette contains the MS-DOS boot files.) And then follow the instructions to swap with the diagnostics diskette #2 for T&D program installed in RAM driver.

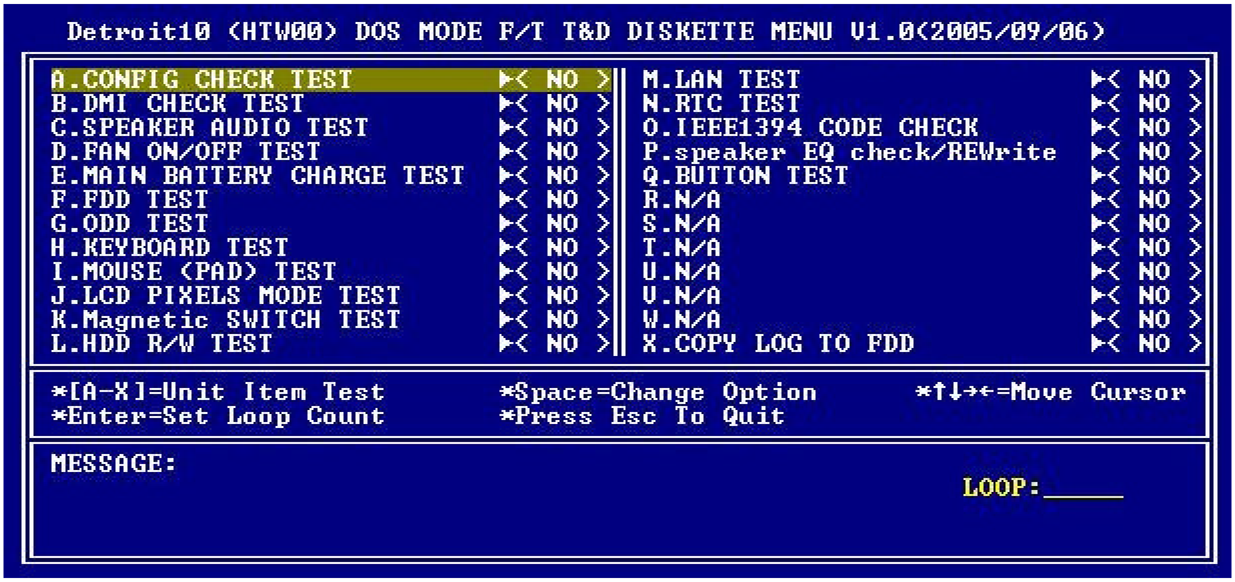
> ***NOTE**: To execute the CD test, make sure the CD is installed in the ODD drive.*

The T&D Program can run by single test item when you press corresponsive English letter of test item, or run two or more test items what you like if you choose them by “Arrow cursors” and “Space Bar” – the wonderful thing is you can setup test loop by “Enter” button. And it also asks you if you like to copy test log file to diskette as reference at the end of test(s).

The test list is as the following:

A. CONFIG CHECK TEST
B. DMI CHECK TEST
C. RTC TEST
D. LAN TEST
E. SPEAKER AUDIO TEST
F. FAN ON/OFF TEST
G. MAIN BATTERY CHARGE TEST
H. FDD TEST
I. ODD TEST
J. KEYBOARD TEST
K. MOUSE (PAD) TEST
L. LCD PIXELS MODE TEST
M. MAGNETIC SWITCH TEST
N. HDD R/W TEST
O. IEEE1394 CODE TEST
P. Speaker EQ Check&Rewrite
Q. Button test

The below display will show up at the beginning of T&D program



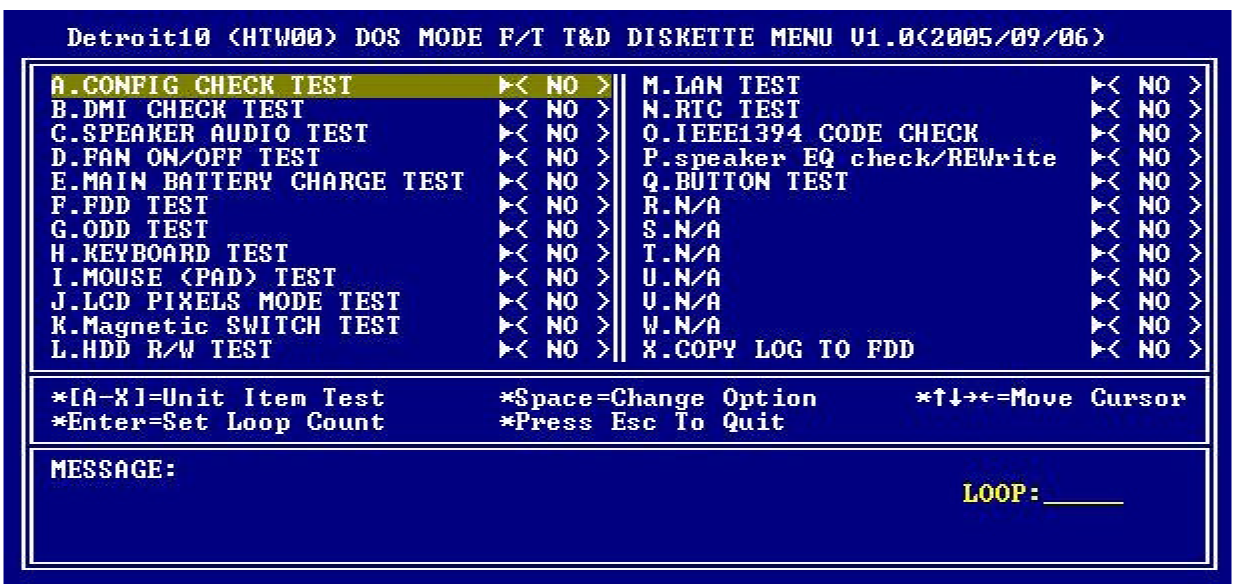
If the test result passes, the following display will show up:



If an error is detected and a test fails, the following message displays:

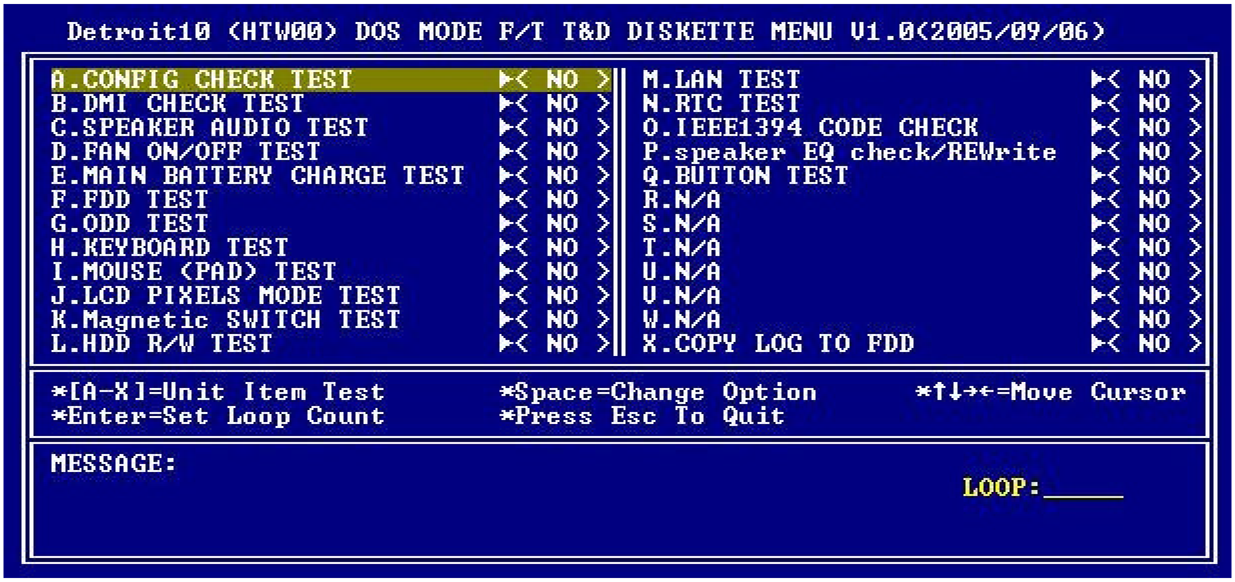


Then press any key for next actions – the below display presented if copying test log file onto diskette is necessary. This action will be executed when "**Y**" key pressed.



It will skip this process if “N” key pressed.

And then it will check if it’s necessary to leave this program. Program will quit when “**Y**” key pressed and it will go back main menu for next test if “**N**” key pressed.



***NOTE**: Press **Pause** to pause a test and **Enter** to resume.*

3.3 Config Check Test

The config check test checks unit configuration. It includes:

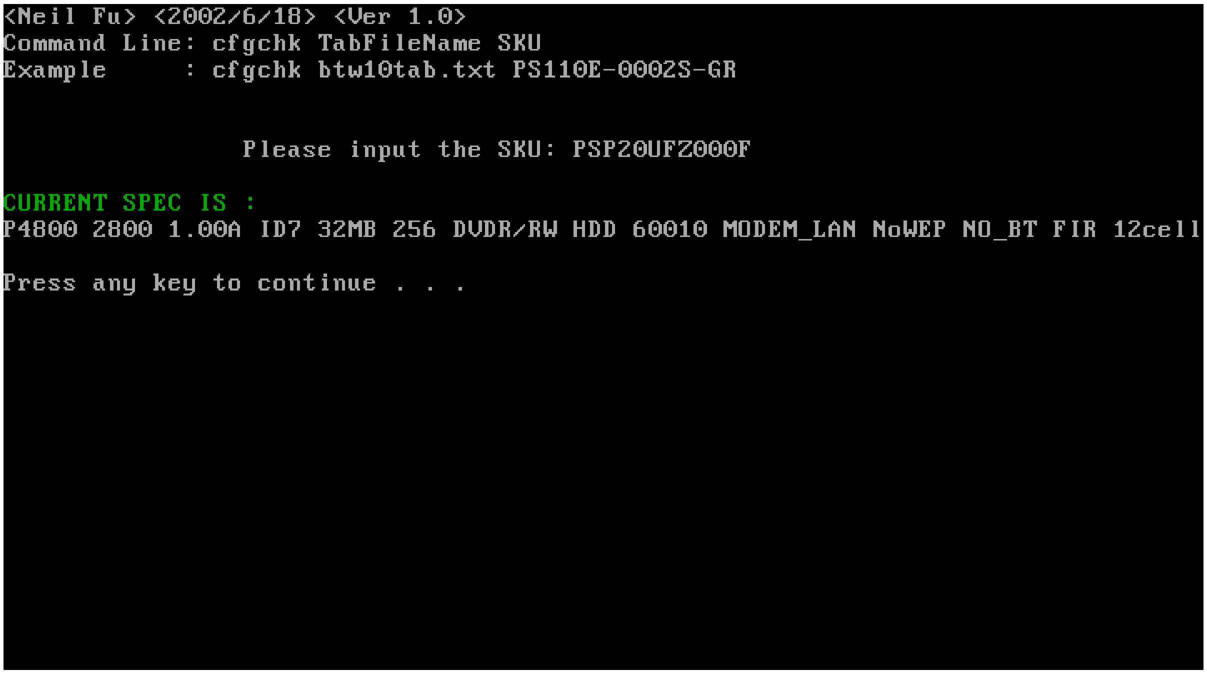
- CPU type (P4/CEL; Dothan; Cache ; CPU speed)
- BIOS version
- Panel ID
- VRAM size
- System memory size (*** MB)
- ODD type (DVD-SuperMulti; COMBO; …)
- HDD type & capacity (Vendor ID. Model .Firmware)
- Wireless type
- LAN Type (LAN10/100)
- Battery cell

This test needs input unit Part Number by manual to make comparison with known SKU data.

> ***NOTE**: To execute this test, you must input unit **Part Number** as “**Uppercase Character**”.*

Then it will show its configuration is correct (in **green** color) or failed (in **red** color).

The screen should display as below, indicating whether the test is passed or failed after comparison.



3.4 DMI Check Test

This test will check if the computer's Desktop Management Interface (DMI) is correct.

DMI includes:

- Manufacturer
- Production Name
- Version
- Serial Number
- UUID
- OEM String

It needs to input unit Part Number by manual, then show this unit DMI information and makes comparison with SKU data.

> ***NOTE**: To execute this test, you must input unit **Part Number** as "**Uppercase Character**".*

The screen should display as below, indicating whether the test is passed or failed after comparison.

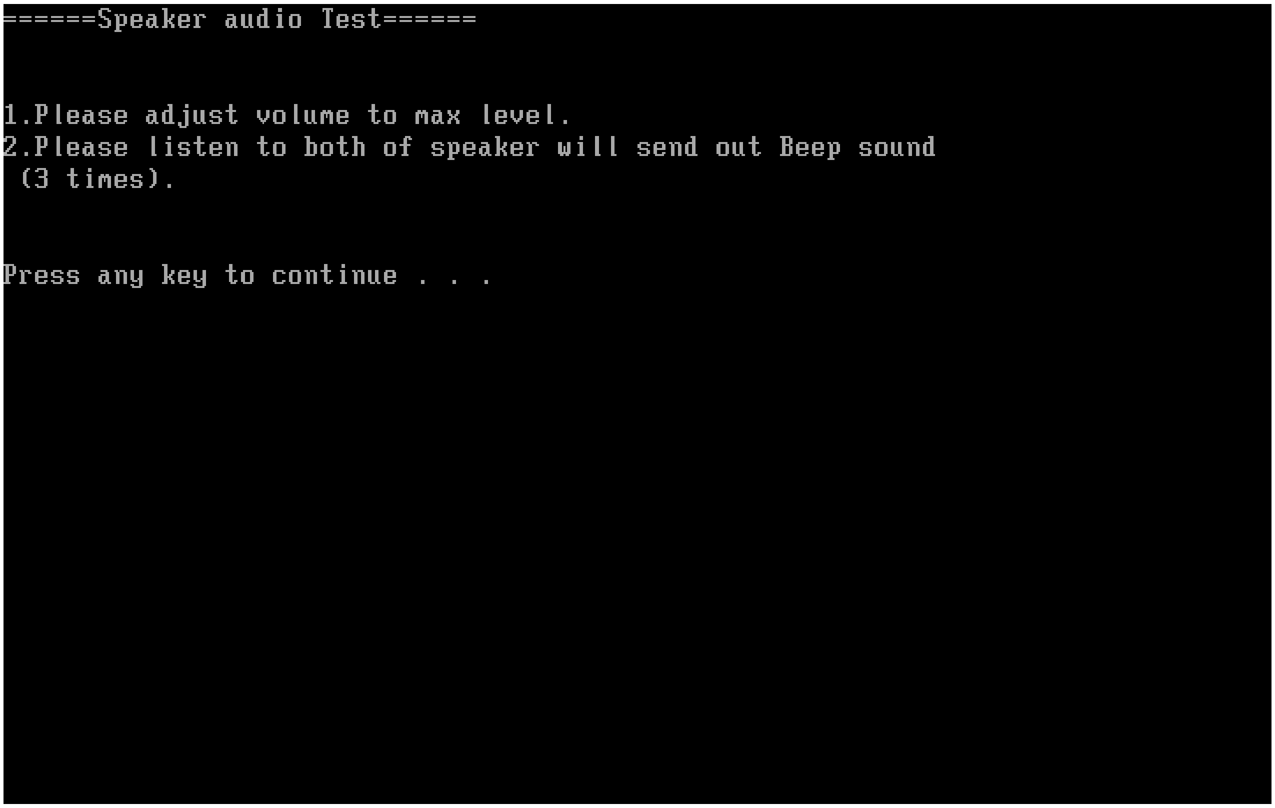


3.5 Speaker Audio Test

The speaker audio test allows the user to aurally confirm the speaker functions. And check both speakers if they are OK within 3 times “Beep” sound generated.

***NOTE**: Remember to tune up the volume as “**Maximum**” before this test starts.*

The screen should display as below, indicating whether the test is passed or failed after the question.


======Speaker audio Test======
1.Please adjust volume to max level.
2.Please listen to both of speaker will send out Beep sound
(3 times).
Press any key to continue . . .

3.6 Fan ON/OFF Test

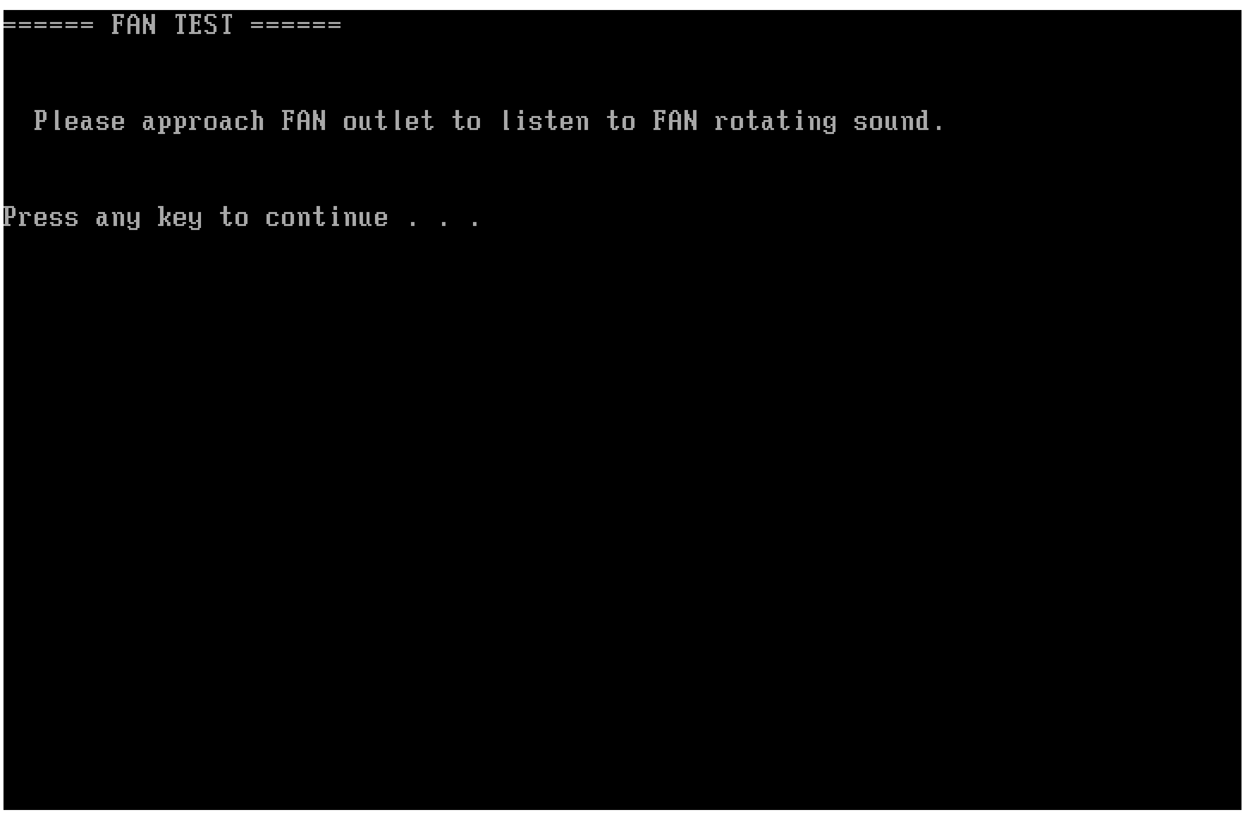
The fan test allows the user to test aurally whether the fan is working. And follow the below procedures for this test:

✍ The computer will let the fan be “ON” after any key pressed. Listen to check whether the fan is working.

> ***NOTE**: Remember to approach fan outlet that is near right side of unit whether fan is “ON”.*

✍ The computer will stop the fan working after any key pressed. Listen to check if the fan is “OFF” – it means no rotating sound.

The screen should display as below, indicating whether the test is passed or failed after the question.



3.7 Main Battery Charge Test

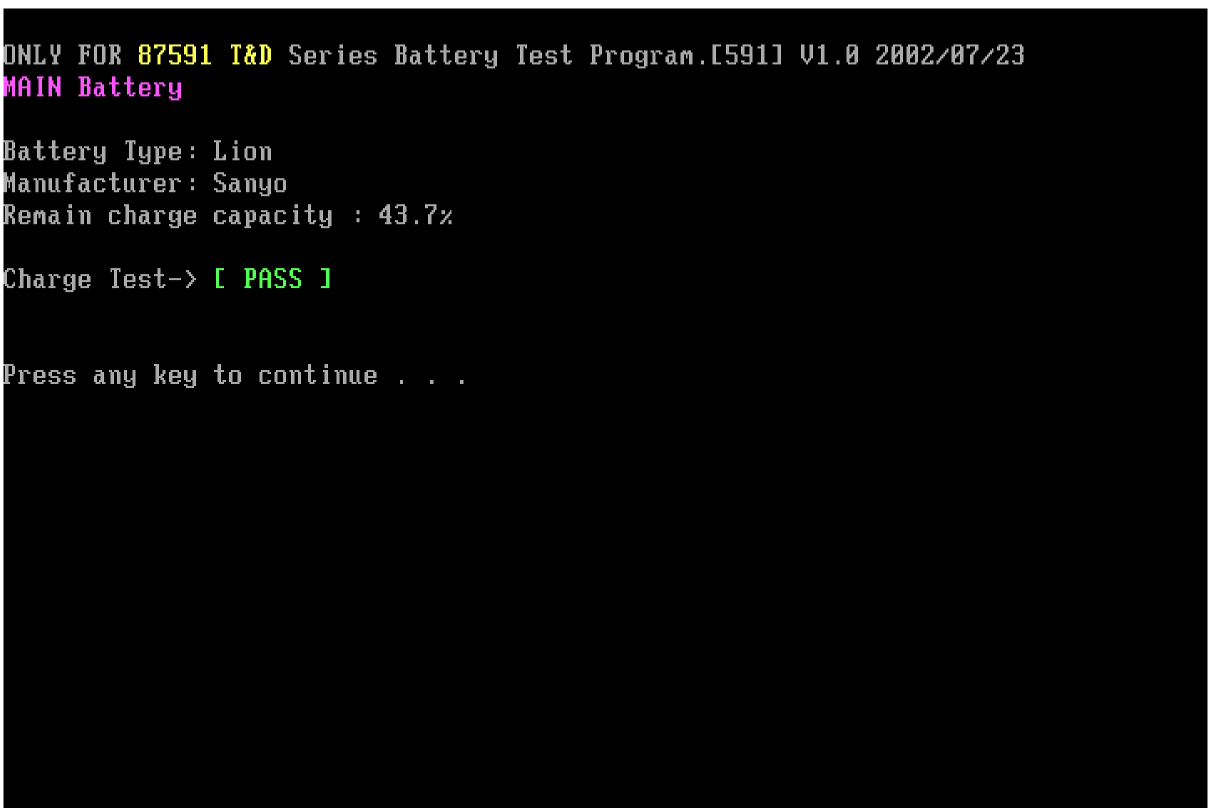
***NOTE**: The AC adaptor (**65W, 19V**) should be connected to successfully run this test.*

This test shows and measures the main battery:

- Battery type (Lion)
- Manufacturer (Sanyo/Panasonic)
- Remain charge capacity (0 ~ 100%)
- Charge function (PASS/FAIL)

  - "Battery Is Full" showed when "remain charge capacities" is 100%

The screen should display as below, indicating whether the test is passed or failed when finished.



3. 8 FDD Test

> ***NOTE**: Before running the FDD test, prepare a formatted work diskette (1.44 MB). Remove the diagnostics diskette and insert the work diskette into the FDD. The contents of the floppy diskette maybe erased.*

The Floppy Disk Test includes three subtests of the:

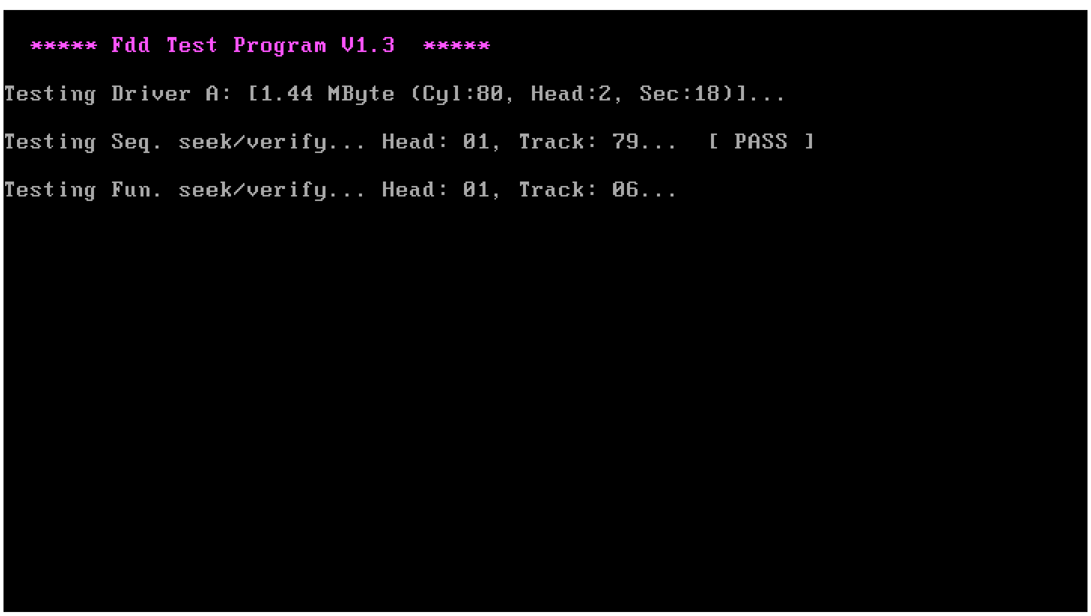
1. Sequential seek/verify function (Range: Track 0 ~ 79)
2. Funnel code seek/verify function (Range: Track 0 ~ 79)
3. Write/Read/Compare pattern function (Range: Track 75 ~ 79)

> ***NOTE**: The write-protected device of this formatted diskette should be "Disable".*

The subtests run automatically.

> ***NOTE**: Press "**Esc**" key can skip the current subtest.*

The screen should display as below, indicating whether the subtests pass or fail when finished.



3. 9 ODD Test

The ODD test allows a user to aurally confirm the ODD functions.

> ***NOTE**: A CD disc (including data file) must be inserted into the ODD drive before this test starts.*

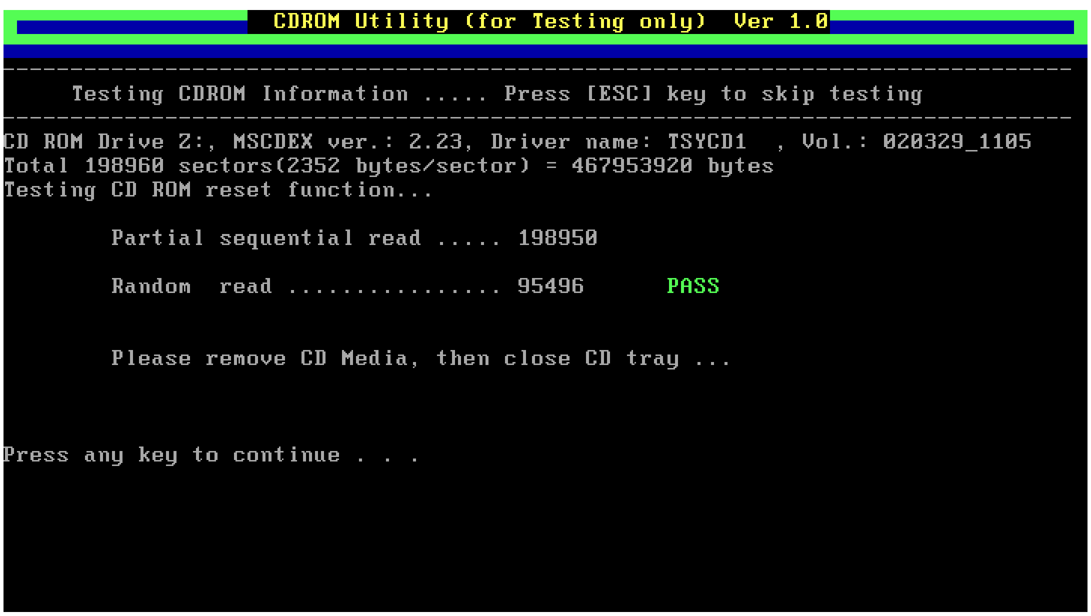
The ODD test includes two subtests of the:

1. Random read/partial sequential read function
2. Sequential read function (for all surface)

Each item can be chosen by manual. When each test item finished, the ODD tray will open. Check whether the tray can open automatically.

> ***NOTE**: Press "**Esc**" key can skip the current subtest.*

The screen should display as below, indicating whether the subtests pass or fail when finished.



3. 10 Keyboard Test

The keyboard test checks the all keys function.

> ***NOTE:*** *The* **Num Lock** *and the* **Overlay** *mode must be off to execute the keyboard test.*

Before keyboard test starts, the keyboard matrix code should be chosen as below display:

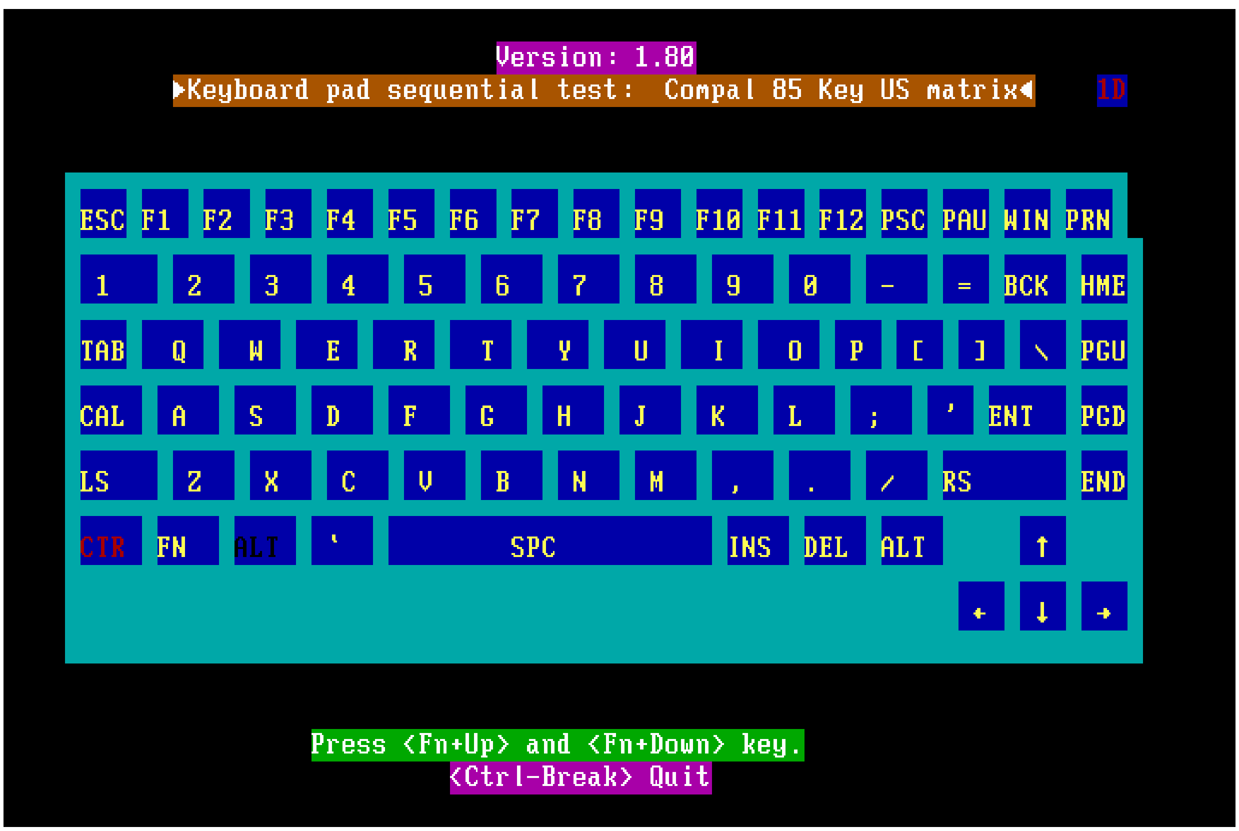
1. **K** (UK, for Europe)
2. **S** (US, for America)

When you execute this test, the keyboard layout is drawn on the display. When any key is pressed, the corresponding key on the screen changes to black as shown below.

It will indicate whether the subtest is passed or failed after the question.

> ***NOTE:*** *The "**Fn**" key cannot be tested in the keyboard test. To determine whether the "**Fn**" key is working correctly, press "**Fn+F6** " or "**Fn+F7** " keys to check if LCD display brightness change gradually.*


Version: 1.80
Keyboard pad sequential test: Compal 86 key UK matrix
38
ESC F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 PSC PAU WIN PRN
1 2 3 4 5 6 7 8 9 0 - = BCK HME
TAB Q W E R T Y U I O P [ ] \ PGU
CAL A S D F G H J K L ; ' ENT PGD
LS Z X C V B N M , . / RS END
CTR FN ALT ` SPC < INS DEL ALT ↑
← ↓ →
Press <Fn+Up> and <Fn+Down> key.
<Ctrl-Break> Quit


Version: 1.80
Keyboard pad sequential test: Compal 85 Key US matrix
1D
ESC F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 PSC PAU WIN PRN
1 2 3 4 5 6 7 8 9 0 - = BCK HME
TAB Q W E R T Y U I O P [ ] \ PGU
CAL A S D F G H J K L ; ' ENT PGD
LS Z X C V B N M , . / RS END
CTR FN ALT ` SPC INS DEL ALT ↑
← ↓ →
Press <Fn+Up> and <Fn+Down> key.
<Ctrl-Break> Quit

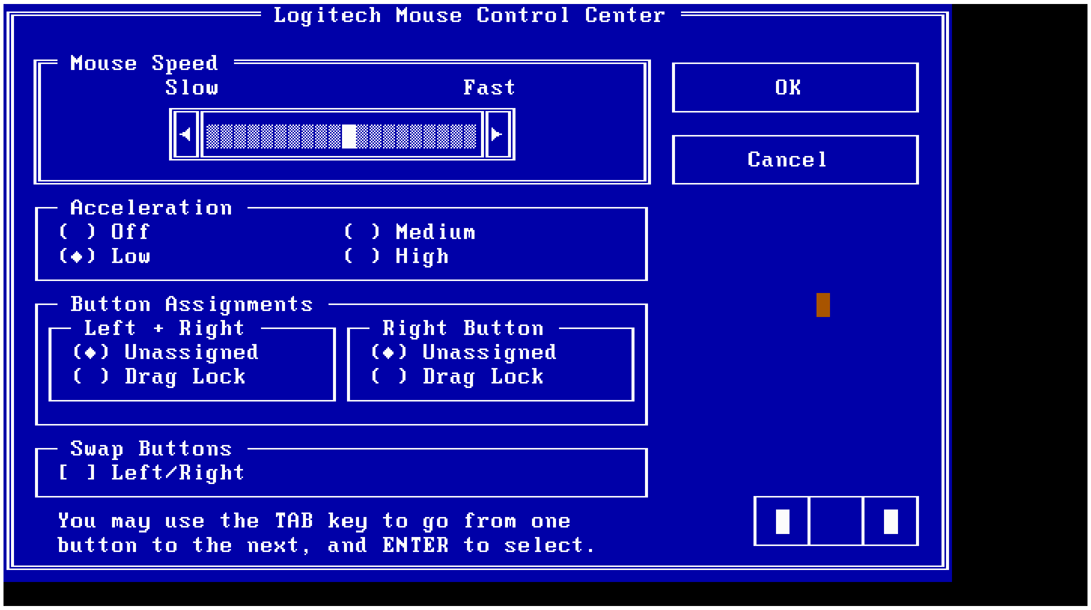
3.11 Mouse (Pad) Test

The Mouse test allows the user to select and assign values to the following, using the Touch Pad or "***Tab***" key to move between selections:

1. Mouse Speed (on a scale from slow to fast)
2. Acceleration (Off, Low, Medium, High)
3. Button Assignments (Left + Right / Right button, either Unassigned or Drag Lock)
4. Swap Buttons (Left /Right)

NOTE: *The Touch Pad test cannot be used to test an external USB mouse.*

The Touch Pad button subtest allows users to test their Touch Pad buttons. If the buttons are clicked, the cursors should appear in the corresponding box of the button figure that is displayed on the screen as below.



After checking T/Pad buttons and cursor's function, use "Tab" key or use T/Pad cursor to click the "OK" column will end this test.

It will indicate whether the subtests pass or fail after three questions.

> ***NOTE:*** *The above figure has three compartments although the Touch Pad installed may only have two buttons. In this case, the central compartment in the figure does not correspond to any button.*

3. 12 LCD Pixels Mode Test

This LCD pixels mode test checks whether video display is fine.

This test includes two modes of the test:

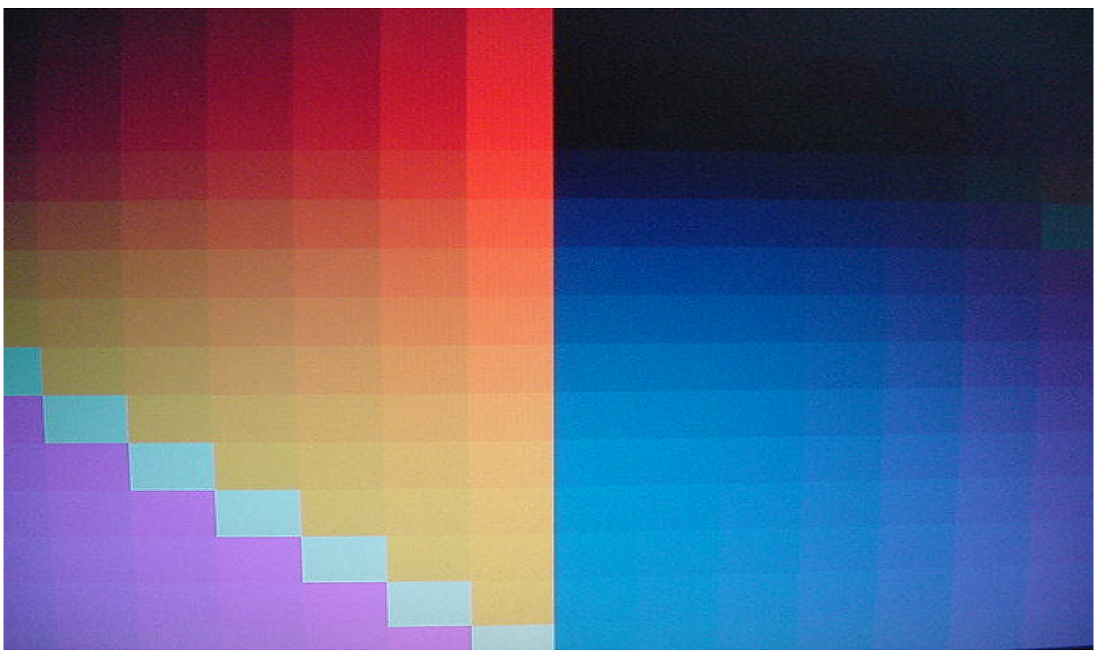
1. Text Mode

   - including 40*25 (16 colors) and 80*25 (2/16colors).

2. VGA Mode

   - including 320*200 (4/16/256 colors), 640*200 (2/16 colors), 640*350 (2/16 colors), 640*480 (2/16/256 colors), 800*600 (256 colors) and 1024*768 (256 colors).

The screen should display as below, indicating whether the test is passed or failed after the question.



3.13 Magnetic Lid Switch Test

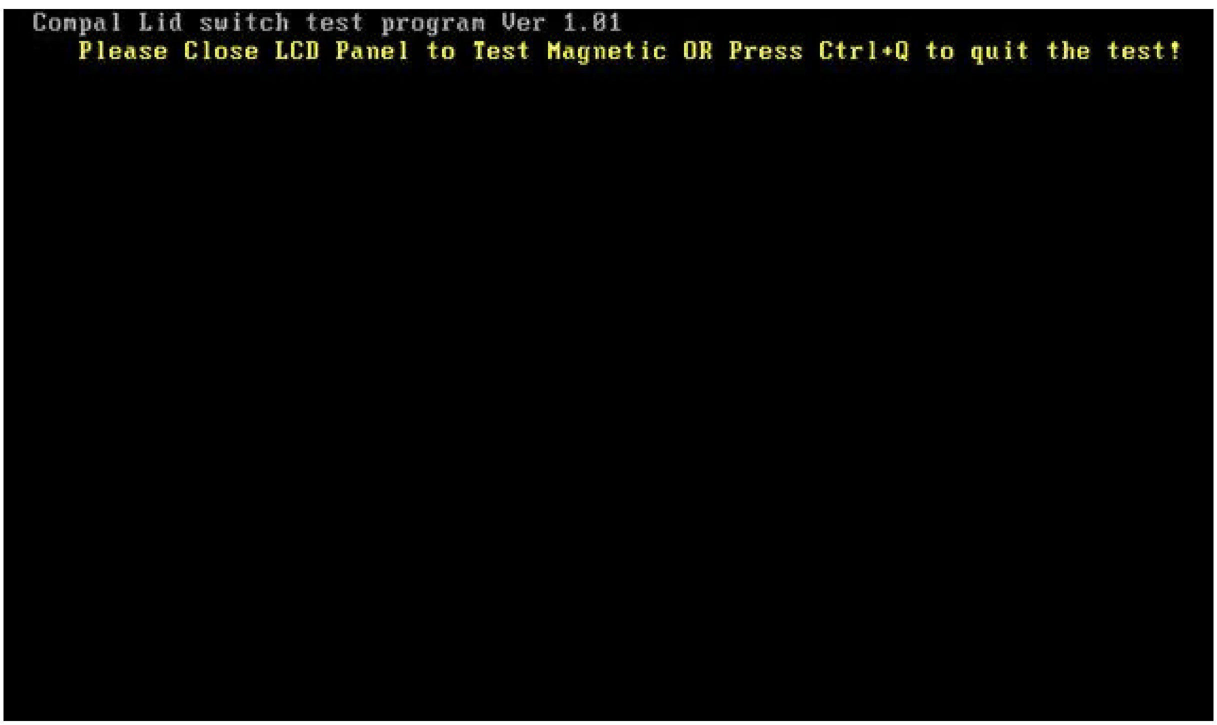
The lid switch test checks the lid function of the unit. When LCD cover closed, the lid should enable to turn off the display.

> ***NOTE**: Remember to tune up the volume as "**Maximum**" before this test starts.*

Follow below steps to run this test:

1. Close the LCD cover.
2. Heard 3 "Beep" sound happened during LCD closed.
3. Open the LCD.

Then it will indicate whether the test is passed or failed.



3.14 HDD R/W Test

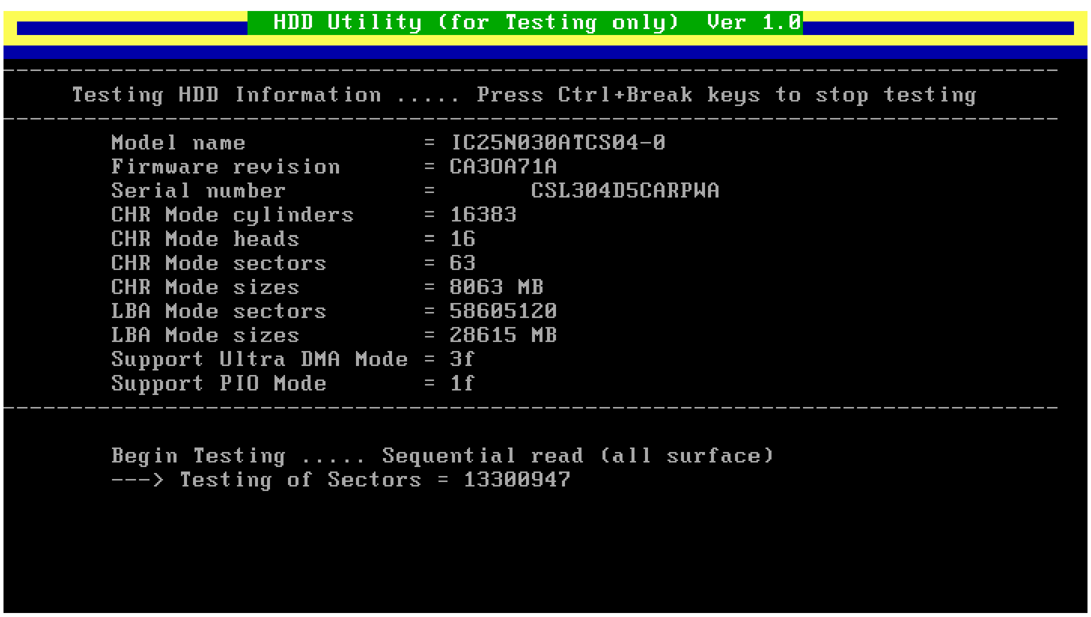
The HDD R/W test allows the user to test aurally HDD read/write function. For data security concern, it is necessary to input password - "**hard disk**" before HDD write test starts.

The HDD test includes three subtests of the:

1. Sequential read (all surface)
2. Sequential write (all surface)
3. Partial W/R + Random W/R

After the choice is made, HDD information will show as below:

- Model name
- Firmware revision
- Serial number
- CHR (Cylinder High Register) mode – including cylinders, heads, sectors and sizes.
- LBA (Logical Block Addressing) mode – including sectors and sizes.
- Support Ultra DMA Mode



> ***NOTE**: Press "**Ctrl + Break**" keys can terminate the current subtest.*

The screen should display as previous picture, indicating whether the subtest is passed or failed when finished.

> ***NOTE**: The AC adaptor should be connected to successfully run this test.*

3.15 LAN Test

The LAN test checks the LAN full-duplex environment.

> ***NOTE:*** *LAN loopback needs to plug in before test begins.*

And LAN information will show on the test screen:

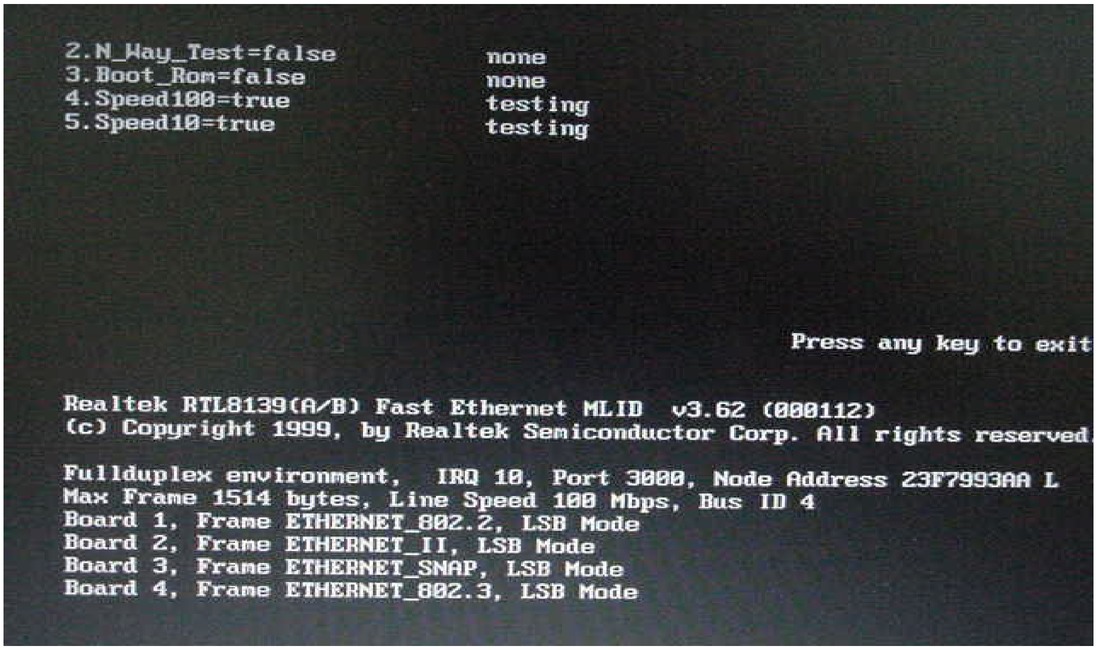
- IO Base – Port: 3000H
- IRQ – AH, it's "IRQ 10".
- Node – it is "MAC Address".
- Line Frame – 1514 Bytes.
- Line Speed – 100Mbps or 10 Mbps.
- Bus ID – it's "4".

The LAN test includes two subtests of the:

1. Speed100
   - Including Ethernet_802.2, Ethernet II, Ethernet SNAP and Ethernet_802.3. All test items are in LSB mode.
2. Speed10
   - Including Ethernet_802.2 in LSB mode.

The subtests run automatically.

The screen should display as below, indicating whether the subtests pass or fail when finished.



If an error is detected and a test fails, the following message displays:

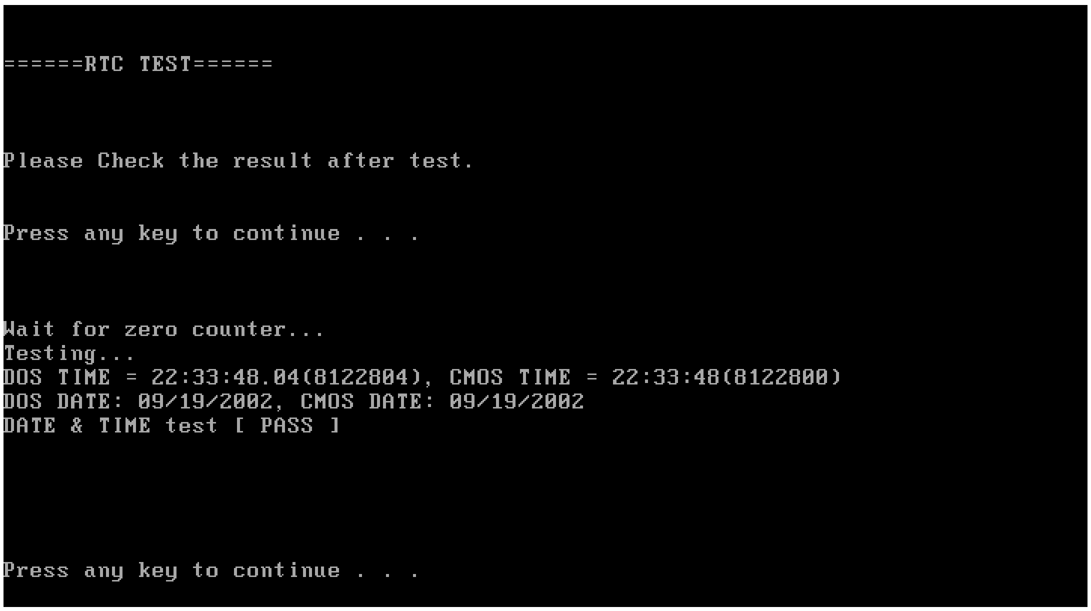


3.16 RTC Test

Checks the computer's RTC (Real Time Clock) and calendar functions by comparing the DOS and CMOS values.

The test runs automatically.

The screen should display as below, indicating whether the test is passed or failed when finished.



3.17 Speaker EQ Type Check&Re-Write

This test will check if the computer's EEPROM EQ type is correct.

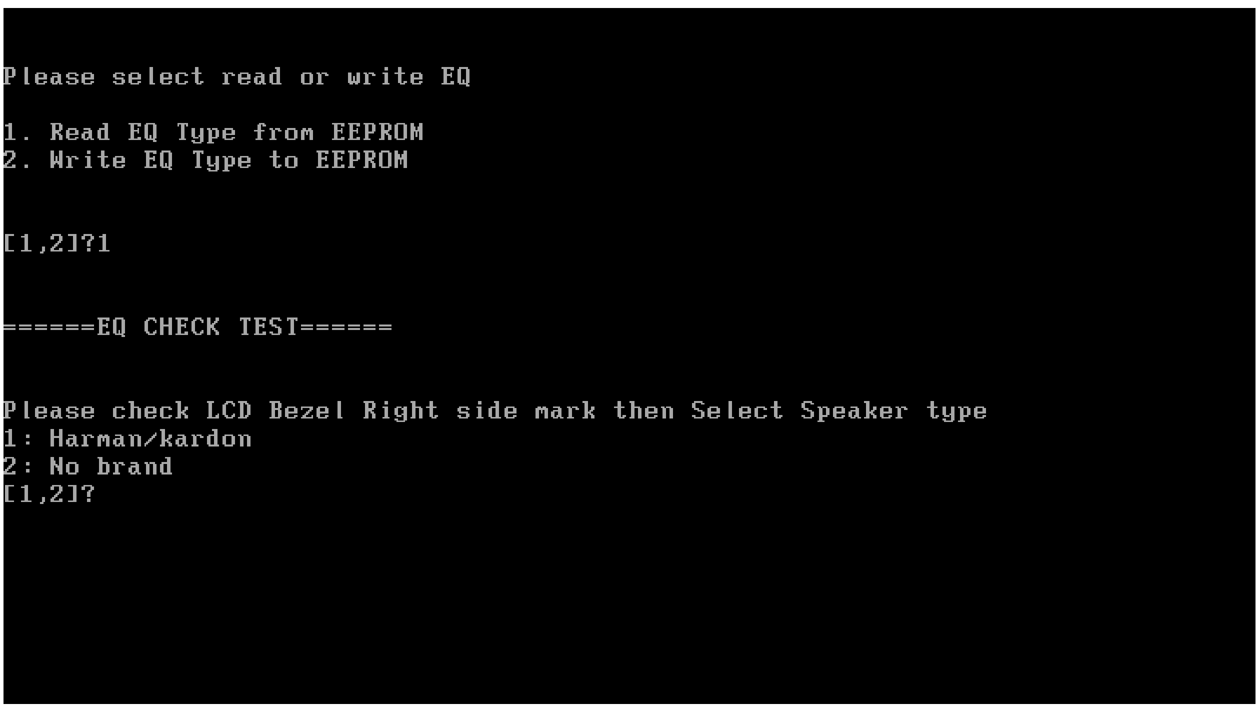
The EQ Type test includes two subtests of the:

1. Read EQ Type from EEPROM

2. Re-Write EQ Type to EEPROM

***NOTE**: To execute this test, you must select speaker type (Harman or No brand).*

The figure below will be displayed:



The Item2 figure below will be displayed:

```
Please select read or write EQ

1. Read EQ Type from EEPROM
2. Write EQ Type to EEPROM


[1,2]?2


======Write EQ to EEPROM ======


Please Select Speaker type (1=Harman;2=No brand)
[1,2]?
```

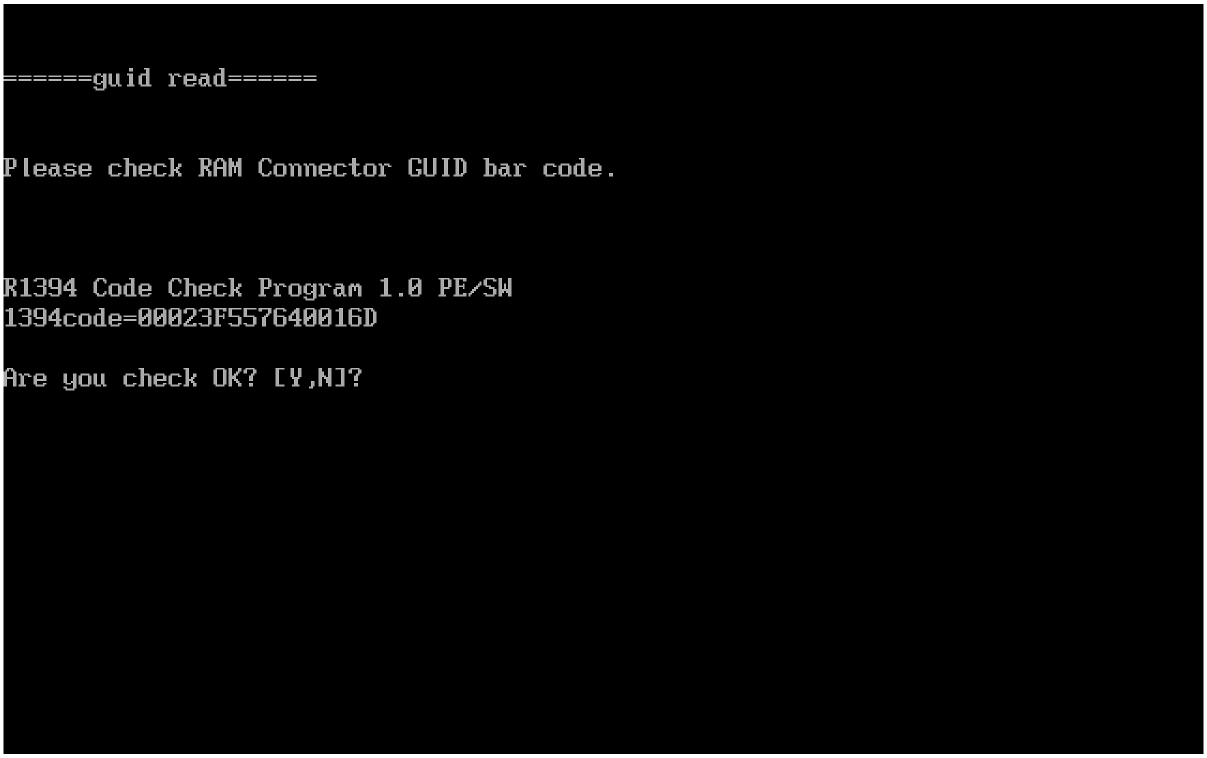
***NOTE**: Write speaker EQ must reboot to enable EQ.*

3.18 Read 1394 GUID

This test will check if the computer's EEPROM 1394GUID code is correct.

NOTE: *Must open the RAM Door to see RAM connector GUID bar code before test item begins.*

The figure below will be displayed:



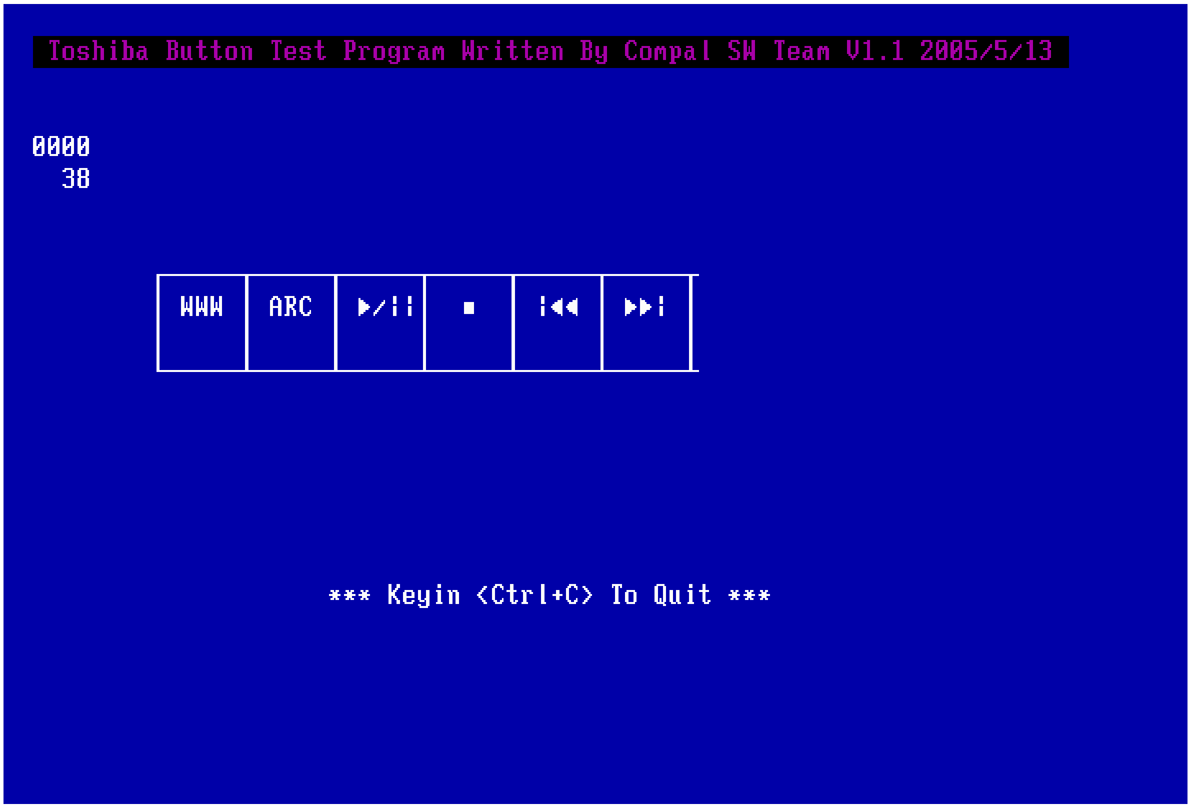
3.19 CD Control Button Test

The CD control button test allows the user to manually test each of the five CD control buttons.

Key ”WWW” need to press first. One will hear one “bi” sound when press”WWW” or “Audio”

Sound and continuously “bi” sound for another key test.

The figure below will be displayed:



Press each of the buttons on the front panel in turn. A yellow bar will appear on the relevant section of the figure if the button passes the test.

Press ***Ctrl +C*** to quit the test.

Chapter 4

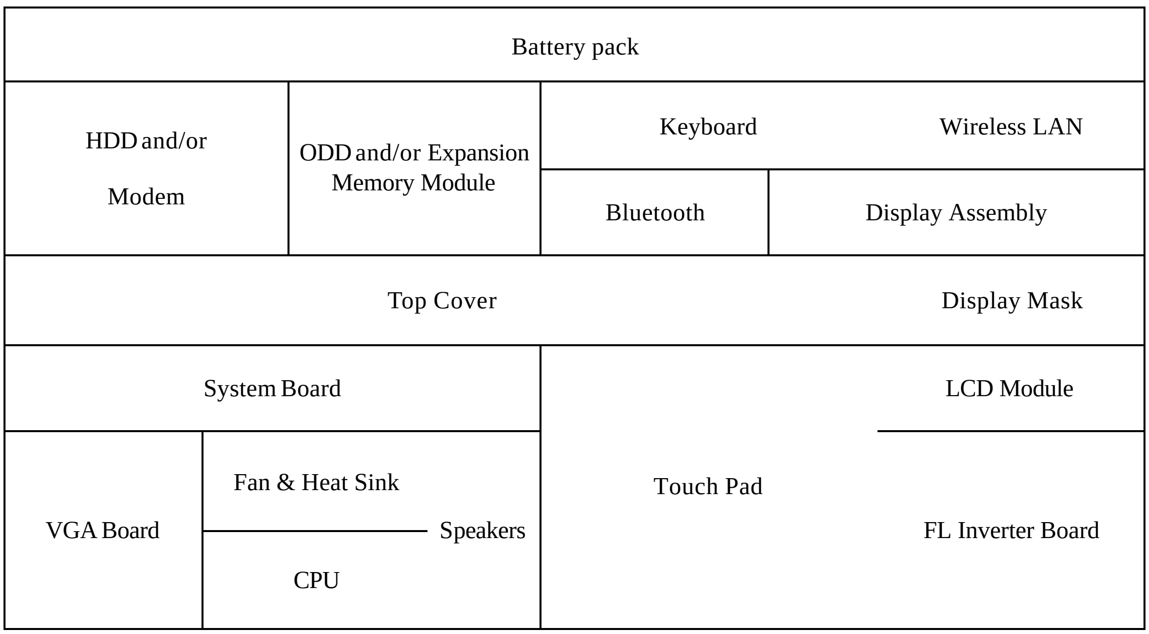
Replacement Procedures

Chapter 4 Contents

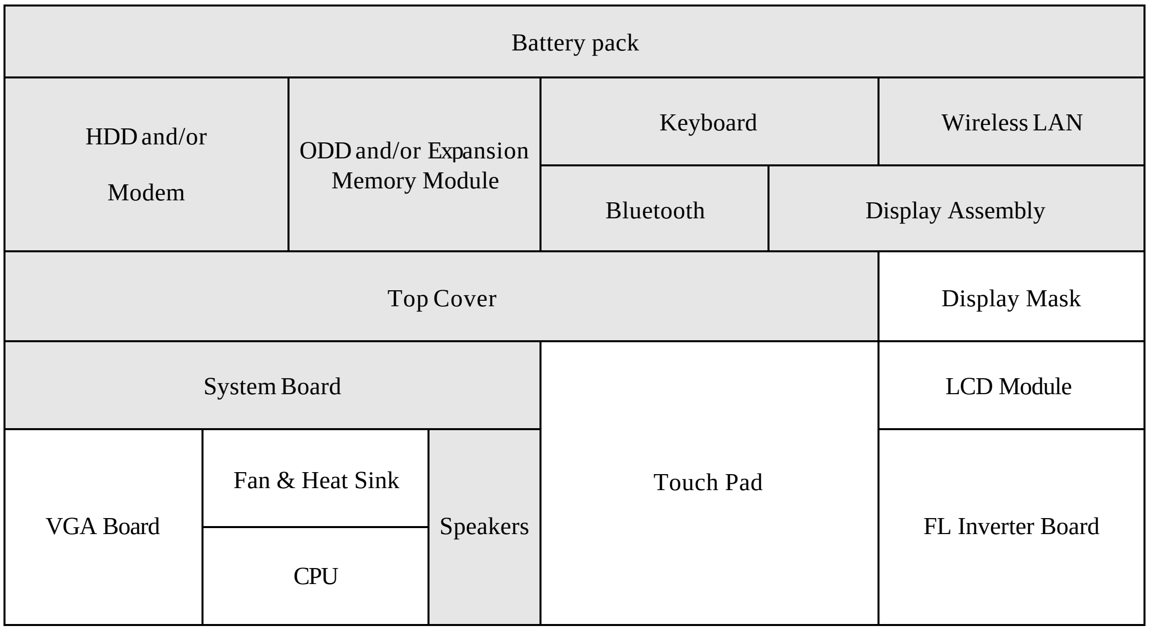
Figures

4.1 General

This chapter explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional PC Card, then follow the chart downward removing only those FRUs necessary to reach the one you think is causing the computer to operate improperly. Refer to the example on the following page.



The example below shows FRUs to be removed before the Speakers can be removed and repaired or replaced. The Speakers are overlapped by the top cover that must be removed before it can be reached. The removable keyboard, and display assembly in turn overlap the top cover. Always starts the disassembly process by removing the battery pack.



Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

DANGER:

1. *Always use the lithium ion battery pack or backup battery that is authorized by Toshiba or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode. Heating or disassembling the battery pack could cause leakage of alkaline solution. Throwing the battery pack into a fire could cause the battery pack to explode.*
2. *The power supply, FL inverter and other components carry high voltages. To avoid the risk of electric shock when you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components. Also, do not disassemble individual components in first-level maintenance.*

WARNING: To avoid the risk of electric shock or other injury:

1. *Always turn the power off and disconnect the AC adaptor from the power source.*
2. *Remove any metal jewelry or accessories such as necklaces, bracelets, or rings. Batteries in the computer retain an electrical charge so there is danger of electrical shock even when the computer is disconnected from an AC power source.*
3. *Never work with wet or damp hands.*
4. *The computer contains sharp edges and corners: be careful not to injure yourself.*
5. *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened.*

CAUTION: To avoid damage to the computer:

1. *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts.*
2. *Metal objects such as screws or paper clips which fall into the unit can cause a short-circuit, fire, or other internal damage.*
3. *When assembling the computer, make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figure. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke, or fire.*
4. *Before removing an FRU or other component, make sure all cables to the component have been disconnected.*
5. *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*

Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adaptor and the battery pack as instructed in section 4.2.

1. Do not disassemble the computer unless it is operating abnormally.

2. Use only the correct and approved tools.

3. Make sure the working environment is free from the following elements whether you are using or storing the computer.

   ✍ Dust and contaminates

   ✍ Static electricity

   ✍ Extreme heat, cold and humidity

4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary troubleshooting and diagnostics tests described in chapters 2 and 3 of this manual.

5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.

6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.

7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.

8. When assembling the computer make sure you use the correct screws to secure the various pieces. Screw sizes are listed in their corresponding figures.

9. The computer contains many sharp edges and corners, so be careful not to injure yourself.

10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

Disassembly Procedures

The computer has two basic types of cable connectors:

- Pressure Plate Connectors
- Standard Pin Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the connector's plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Standard pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that no cables will be pinched by screws or the FRU.
- Check that all latches are closed securely.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

After installing an FRU in the computer, confirm that the FRU and the computer are functioning properly.

Tools and Equipment

The use of Electrostatic Discharge (ESD) equipment is very important for your safety and the safety of those around you. Proper use of these devices will increase the success rate of your repairs and lower the cost for damaged or destroyed parts. The following equipment is necessary to disassemble and reassemble the computer:

- One M2 Phillips screwdriver to remove and replace screws.
- One T8 security screwdriver.
- Tweezers, to lift out screws that you cannot grasp with your fingers.
- ESD mats for the floor and the table you are working on.
- ESD wrist strap or heel grounder.
- Anti-static carpeting or flooring.
- Air-ionizers in highly static sensitive areas.

4.2 Battery

Removing the Battery Pack

To remove the battery pack from the battery bay, follow the steps below.

1. Turn the computer upside down.
2. Disengage the battery lock (A) and slide the battery bay latch (B) to release the battery pack. Then you can remove it from the bay (C).

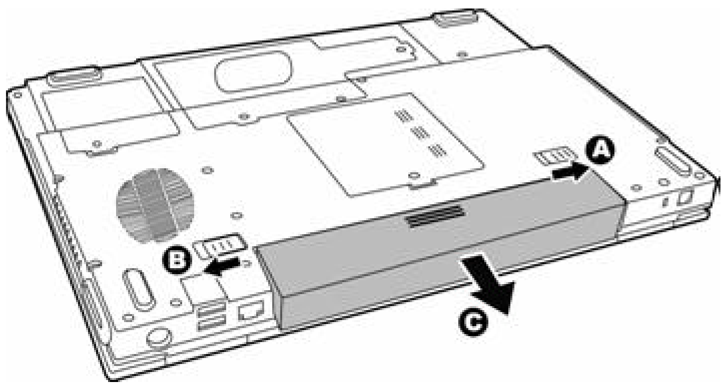


Figure 4-1 Removing the battery pack

> ***NOTE:*** *For environmental reasons, do not throw away a spent battery pack. Please return spent battery packs to Toshiba.*

Installing the Battery Pack

To install the battery pack in the battery bay, follow the steps below and refer to the figure in the preceding section.

> ***WARNING:*** *The battery is a lithium ion battery and can explode if not properly replaced, used, handled or disposed of. Use only batteries recommended by Toshiba as replacements.*

1. Slide the battery pack into the battery bay. The battery bay latch clicks into place automatically.

4.3 PC Card

Removing a PC Card

To remove a PC Card, follow the steps below.

1. Click the Safely Remove Hardware icon on the Task Bar.

2. Click the PC Card you want to remove.

3. Press the eject button of the PC Card to extend it.

4. Press the extended eject button to pop the card out slightly.

5. Grasp the PC Card and remove it.

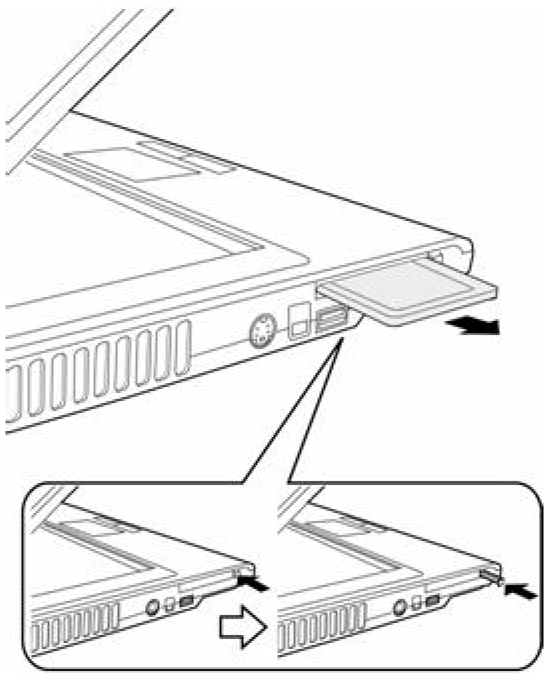


Figure 4-2 Pressing the eject button

Installing the PC Card

To install the PC Card, follow the steps below and refer to the figures in the preceding section.

1. Insert the PC Card.

2. Press gently to ensure a firm connection.

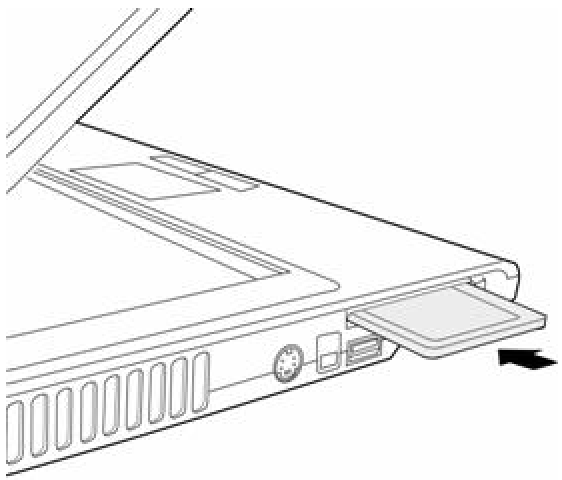


Figure 4-3 Installing the PC card

4.4 HDD

***CAUTION**: When handling the HDD, do not press the top surface as shown by the arrow. Hold it by the sides.*

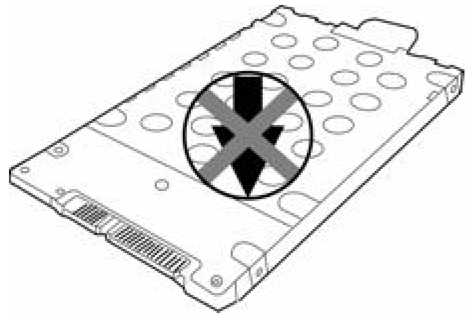


Figure 4-4 HDD

Removing the HDD Module

Follow the steps below to remove HDD module:

1. Turn the computer upside down
2. Remove three black M2.5x4 safety screws to release the HDD door.
3. Remove two M2.5x3 screws from HDD.
4. Pull on the tab to remove the HDD unit.

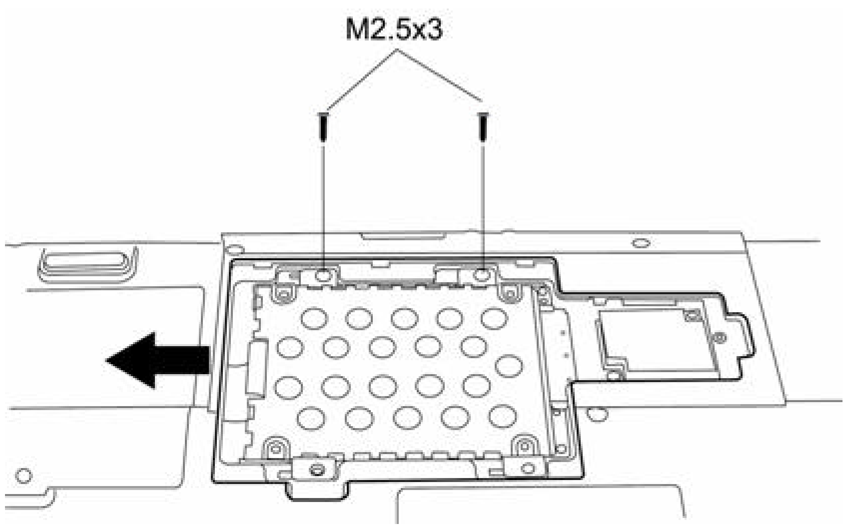


Figure 4-5 Removing the HDD unit

5. Remove four M3x3 silver screws that secure the EMI Shielding to the HDD.

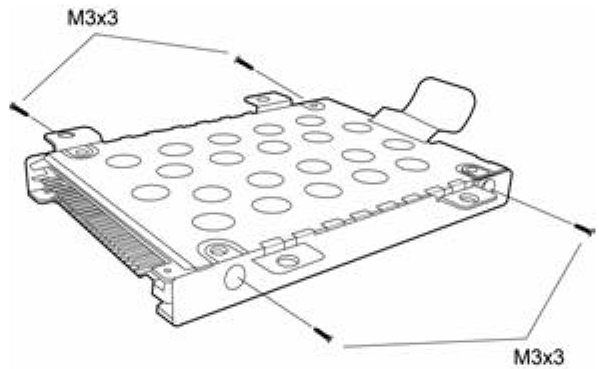


Figure 4-6 Removing the HDD unit

6. Remove the HDD from the EMI Shielding.

Installing the HDD

To install the HDD, follow the steps below and refer to the figures in the preceding section.

1. Seat the HDD in the EMI Shielding, and secure it with four M3x3 black screws.
2. Insert the HDD unit into the HDD slot.
3. Secure the HDD with two black M2.5x3 screws.
4. Secure the HDD door with three black M2.5x4 safety screws.

4.5 Modem

Removing the Modem

To remove the modem, you need to remove the HDD door first, described in the preceding section. Follow the steps below:

1. Remove two black M2.5x3 screws securing the modem to the chassis.

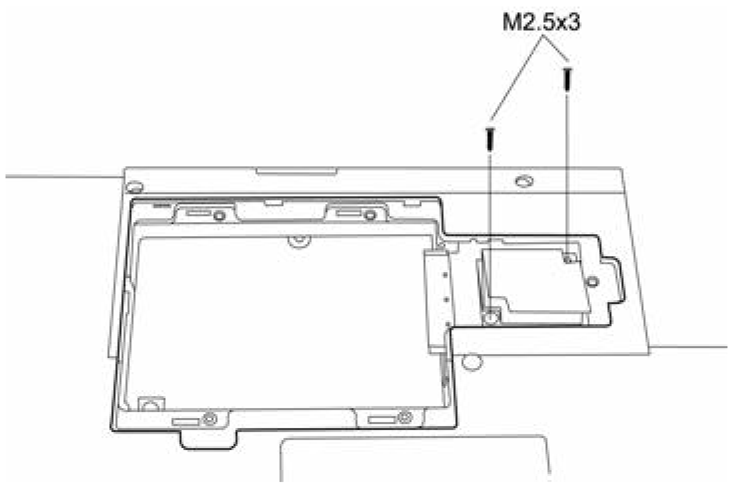


Figure 4-7 Removing the Modem

2. Disconnect the RJ-11 wire, then remove the modem.

Installing the Modem

To install a modem, follow the steps below and refer to the figures in the preceding section.

1. Connect the modem cable to the modem module.

2. Fit the modem onto its connector and secure it with two black M2.5x3 screws.

4.6 Expansion Memory

Removing the Expansion Memory

To remove the memory module, make sure the computer is in boot mode:

1. Remove one M2.5x4 screw securing the expansion memory compartment cover.
2. Push the latches securing the memory module to the outside to release it (A). A spring will force one end of the module up (B).
3. Grasp the module and pull it out (C).
4. Seat the cover and secure its screws.

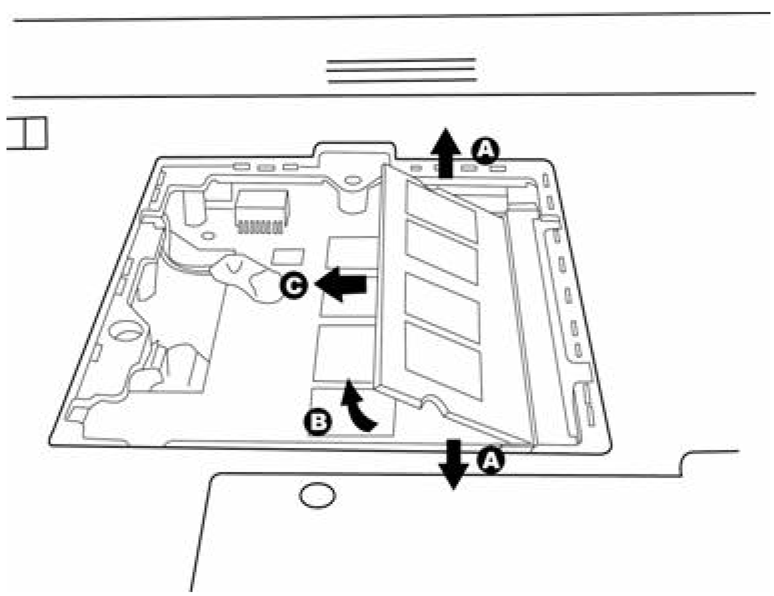


Figure 4-8 Removing the expansion memory

> ***CAUTION**: Do not touch the connectors on the expansion memory or on the computer. Debris on the connectors may cause memory access problems.*

Installing the Expansion Memory

> ***CAUTION**: Do not touch the connectors on the expansion memory or on the computer. Debris on the connectors may cause memory access problems.*

To install a memory module, follow the steps below and refer to the figures in the preceding section:

1. Fit the module's connectors into the computer's connectors at about a 45-degree angle and press the module carefully to ensure a firm connection (A).

2. Push the module down so it lies flat (B). Latches on either side will click into place to secure the module.

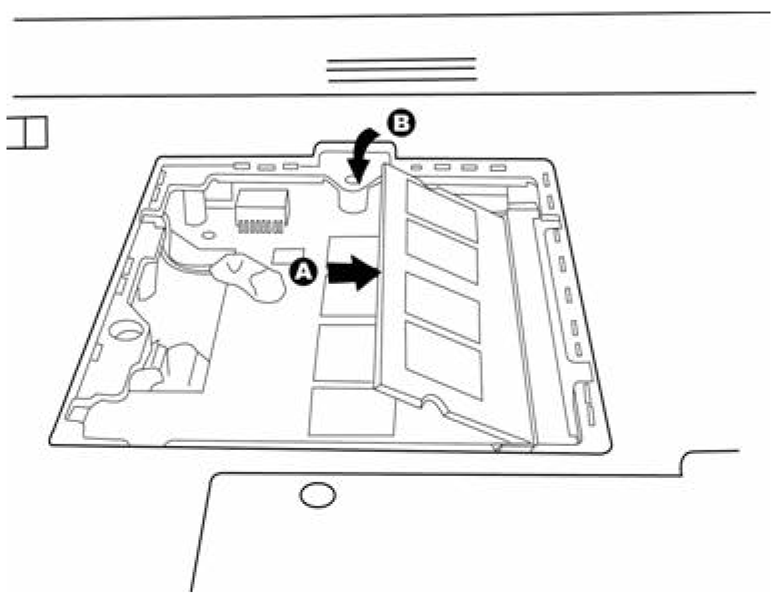


Figure 4-9 Installing the expansion memory

4.7 Wireless LAN Unit

Removing the Wireless LAN Unit

To remove wireless LAN unit:

1. Remove the M2.5x4 screw securing the wireless LAN door, and then remove it. (NOTE: The Satellite Pro M70 may have an embedded safety screw.)

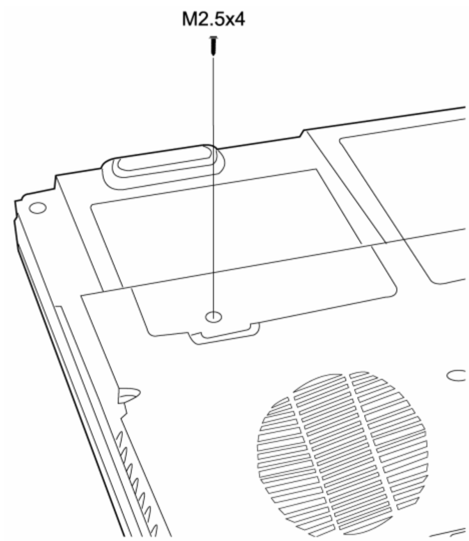


Figure 4-10 Removing the wireless LAN door

2. Disconnect the antenna wires from the wireless LAN module.

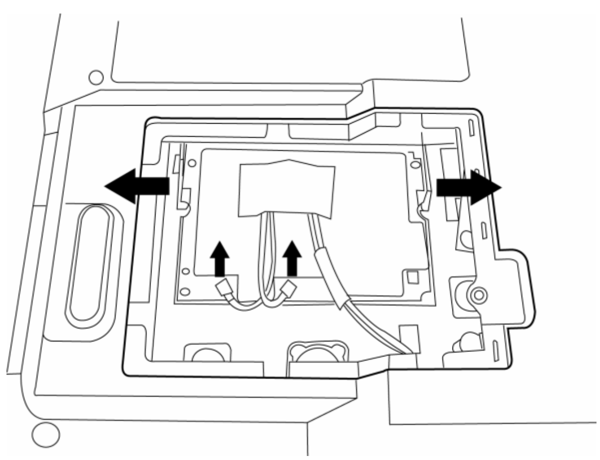


Figure 4-11 Removing the wireless LAN card

3. Use your fingers to press the two latches of LAN unit container. The LAN unit will pop up.

4. Grasp the wireless LAN unit and pull it out.

> ***CAUTION****: Do not touch the connectors on the wireless LAN unit or on the computer. Debris on the connectors may cause malfunction.*

Installing the Wireless LAN Unit

To install the wireless LAN unit, follow the steps below and refer to the figures in the preceding section.

1. Remove the screw M2.5x4 securing the wireless LAN door, and then remove it. (NOTE: The Satellite Pro M70 has an embedded safety screw.)

> ***CAUTION****: Do not touch the connectors on the wireless LAN unit or on the computer. Debris on the connectors may cause malfunction.*

2. Gently, push the wireless LAN unit into the wireless LAN container. The two latches of container will automatically close up.

3. Attach the white antenna to the main connector, and the black antenna to the Aux connector.

4.8 Optical Drive Module

Removing the Optical Drive Module

To remove the optical drive module, you need to open the expansion memory compartment first. Follow the steps below:

1. Turn the computer upside down.
2. Remove the screw M2.5x6 securing the optical drive module.
3. Use your hand to pull the module and then you can slide the module from the bay.

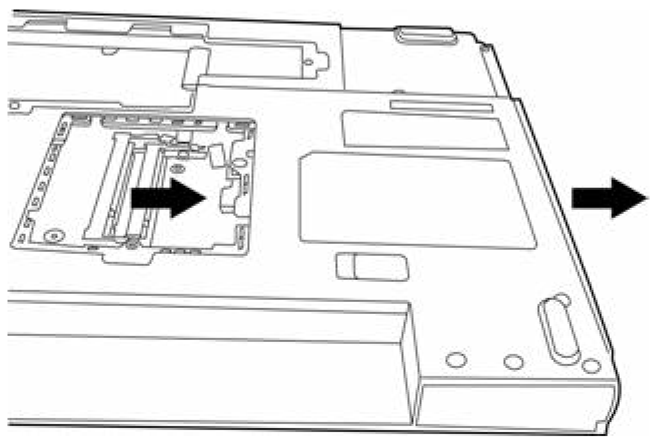


Figure 4-12 Removing the optical drive module

Installing the Optical Drive Module

To install a device in the optical drive module bay, follow the steps below and refer to the figure in the preceding section.

1. Slide the device into the optical drive module bay.

2. Use one M2.5x6 screw to secure the optical drive module.

4.9 Optical Drive

This computer may be fitted with a: CD-RW/DVD-ROM drive
DVD Super Multi drive

Disassembling the Optical Drive

To disassemble the optical drive, first remove the drive from its module bay, then follow the steps below.

1. Remove two black M2x3 screws from the bracket plate. Remove the bracket plate.

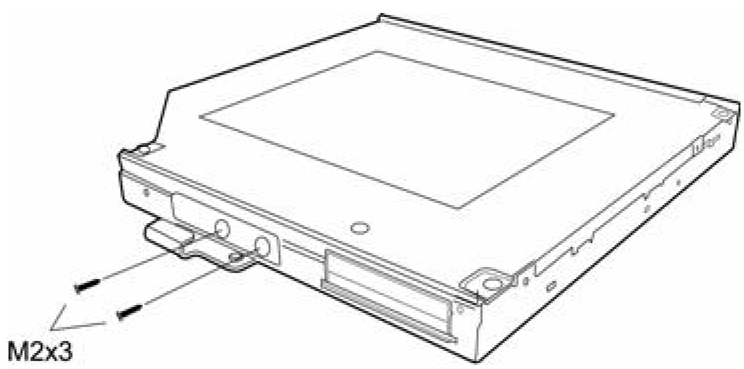


Figure 4-13 Removing the optical drive bracket

Reassembling the Optical Drive

To reassemble an optical drive, follow the steps below and refer to the figure in the preceding section.

1. Position the optical drive bracket plate to the rear panel of optical drive.
2. Secure the optical drive bracket plate with two black M2x3 screws.

4.10 Keyboard

Removing the Keyboard

Follow the steps below to remove the keyboard:

1. Open the display panel.

2. Insert a thin tool into the gap between the strip cover and keyboard to lever the strip cover up and then release the strip cover.

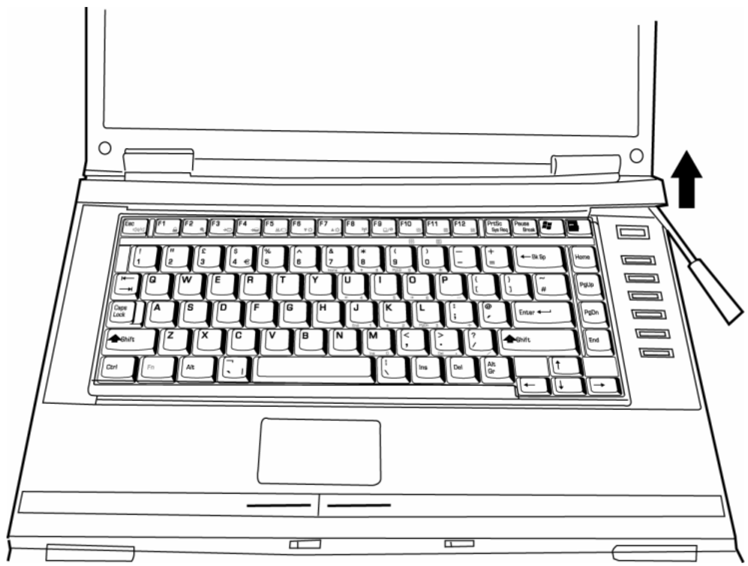


Figure 4-14 Removing the strip cover

3. Remove two M2x3 black screws securing the keyboard.

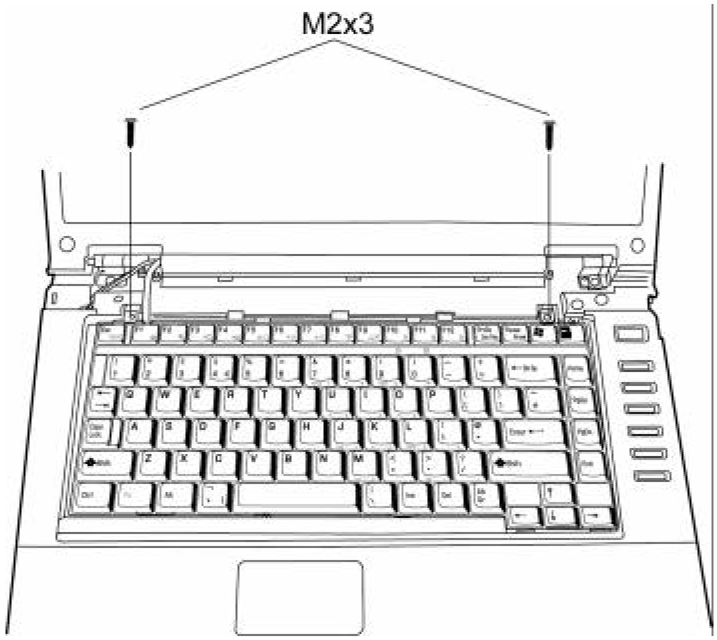


Figure 4-15 Removing the keyboard

4. Disconnect the keyboard FPC cable and remove the keyboard.

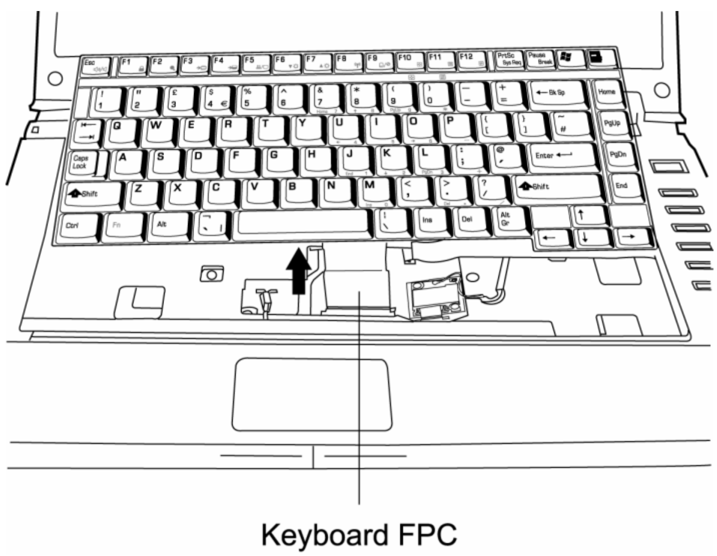


Figure 4-16 Disconnecting the keyboard cable

Installing the Keyboard

To install the keyboard, follow the steps below and refer to the figures in the preceding section.

1. Connect the keyboard FPC cable to the system board.
2. Set the keyboard in place and secure it with two M2x3 black screws.
3. Set the strip cover and press down to secure the strip cover latches engage.

4.11 Display Assembly

Removing the Display Assembly

To remove the display assembly, first remove the keyboard and wireless LAN, then follow the steps below:

1. Disconnect the LCD power cable from the top chassis.

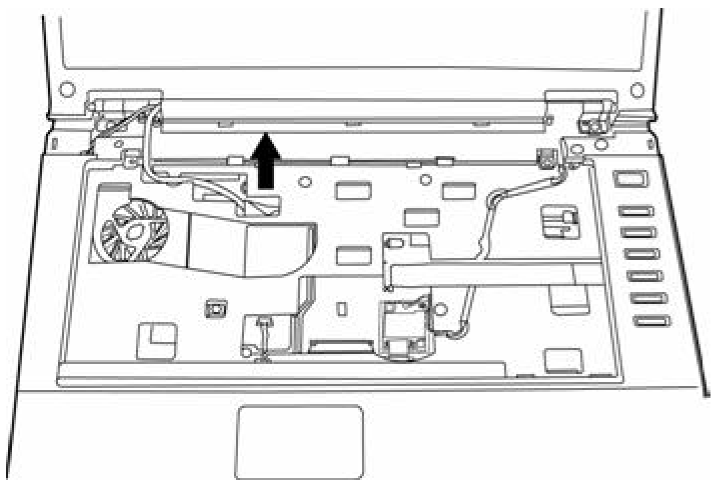


Figure 4-17 Disconnecting the LCD cable

2. Remove the keyboard door on the left hand side of the computer chassis.

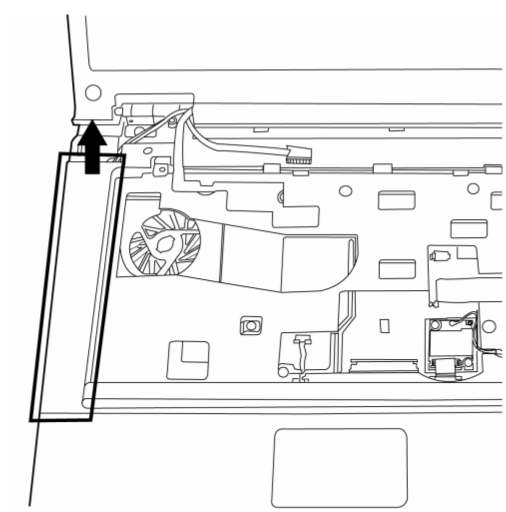


Figure 4-18 Removing the keyboard door

3. Pull out the wireless LAN antennas.

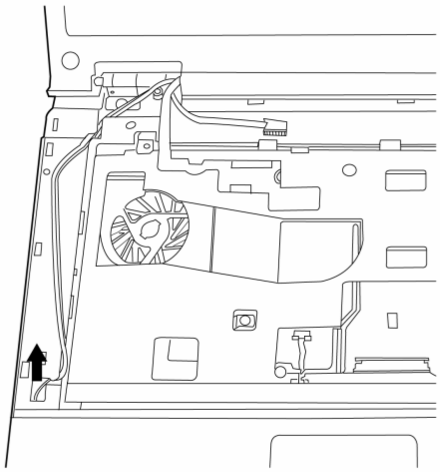


Figure 4-19 Pulling out the wireless LAN antennas

4. From the backside, remove two M2.5x12 screws securing the LCD.

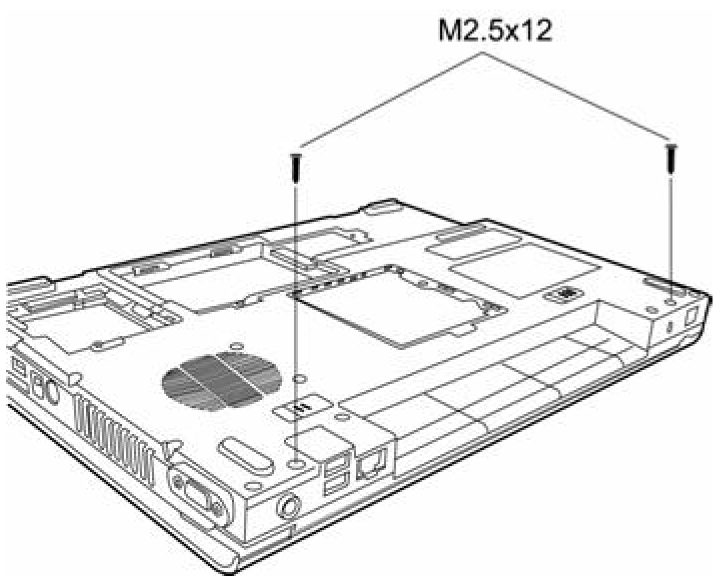


Figure 4-20 Removing the screws from the backside

5. Remove two M2.5x6 screws securing display assembly to the top cover, the disengage the display assembly from the chassis.

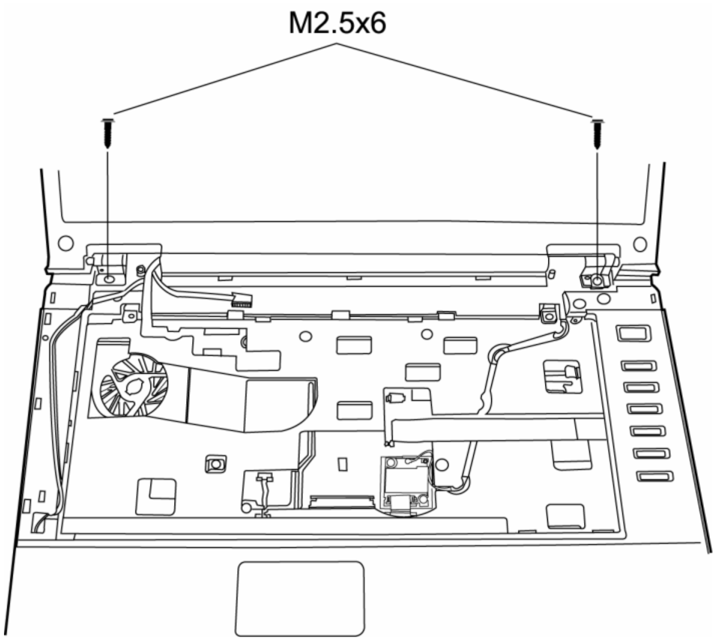


Figure 4-21 Removing the display assembly

Installing the Display Assembly

To install the display assembly, follow the steps below and refer to the figures in the preceding section.

1. Seat the display assembly taking care not to crush to the LCD power cable or wireless LAN antenna.
2. Secure two M2.5x6 black screws to each hinge on the topside.
3. Secure two M2.5x12 black screws to the computer's backside.
4. Connect the LCD power cable to the top chassis.
5. Thread the wireless LAN antennas back into their hole.
6. Restore the keyboard door.

4.12 Bluetooth

Removing the Bluetooth module

To remove the Bluetooth module, first remove the keyboard as described in the preceding section and then follow the steps below:

1. Disconnect the antenna wire from the antenna connector.
2. Disconnect the Bluetooth FFC.
3. Remove two black M2x3 screws securing the Bluetooth module to the chassis.

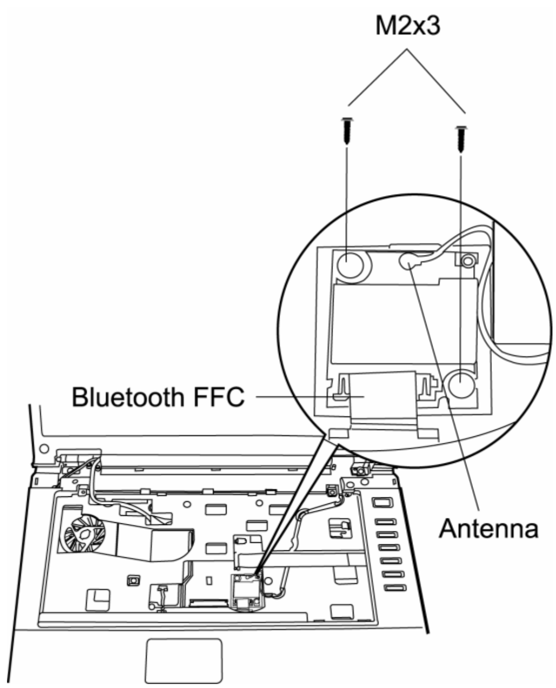


Figure 4-22 Removing the Bluetooth module

Installing the Bluetooth module

To install the Bluetooth module, follow the steps in the below and refer to the figures in the preceding section.

1. Seat the Bluetooth module on the chassis, then secure it with two black M2x3 screws.
2. Connect the Bluetooth FFC to the module.
3. Connect the antenna wire to the antenna connector.

4.13 Top Cover

Removing the Cover

To remove the top cover, first remove the battery pack, keyboard, display assembly, optical drive module, HDD, and memory module and wireless LAN as described in the preceding sections, then follow the steps below:

1. Remove one M2.5x13 screw, two M2.5x6 screws, and one M2.5x3 screw securing top cover.

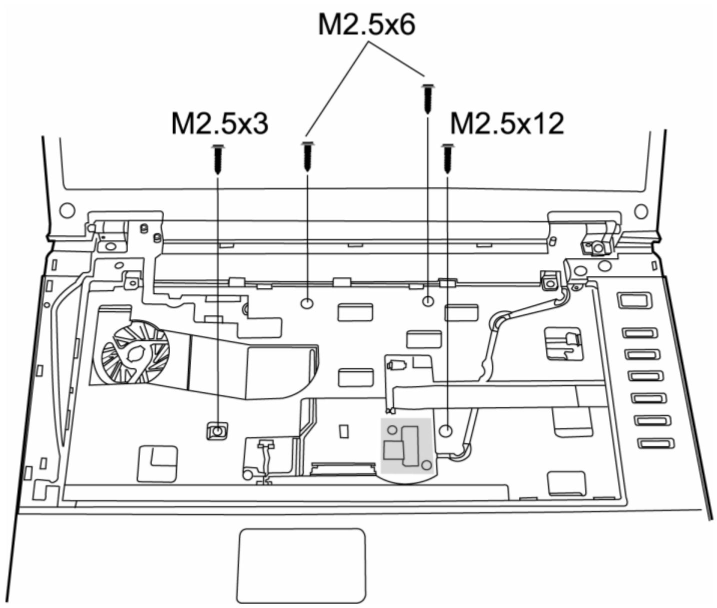


Figure 4-23 Removing the top cover-1

2. Detach the Power Switch FFC cable and TouchPad FFC cable on the top chassis.

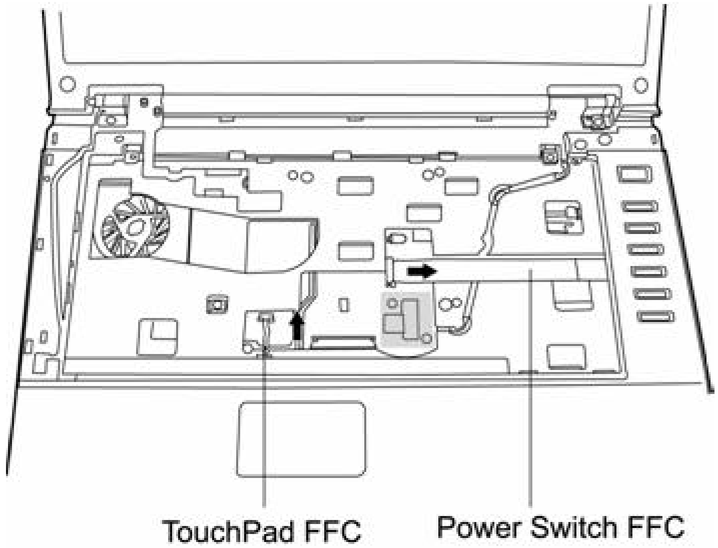


Figure 4-24 Removing the top cover-2

3. Turn the computer upside down and remove eleven M2.5x12, four M2.5x8 screws and one M2.5x3 screw securing the bottom cover to the top cover.

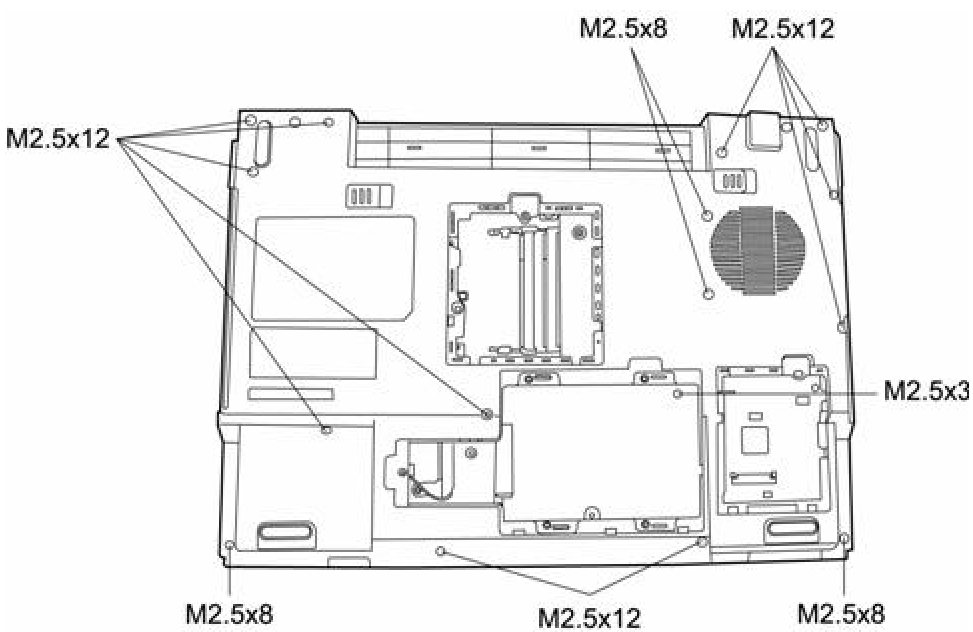


Figure 4-25 Removing the top cover-3

4. Turn the computer upright to lift off the top cover.

Installing the Top Cover

To install the top cover, follow the steps below and refer to the figures in the preceding section.

1. Seat the top cover and secure the upper FFC cable and Touch pad FFC cable to the computer's top chassis.
2. Secure the top cover with one M2.5x13 screw, two M2.5x6 screws, and one M2.5x3 screw.
3. Turn the computer upside down and secure eleven M2.5x12 screws, four M2.5x8 and one M2.5x3 screw.

4.14 TouchPad

Removing the TouchPad

To remove the TouchPad, first remove the top cover, then follow the steps below:

1. Disconnect the TouchPad FFC cable from the TouchPad.
2. Remove two M2.5x3 black screws securing the control button board. Slide it and lift it out.
3. Remove one M2.5x3 screw securing the TouchPad Bracket. Slide it and lift out the TouchPad Bracket.

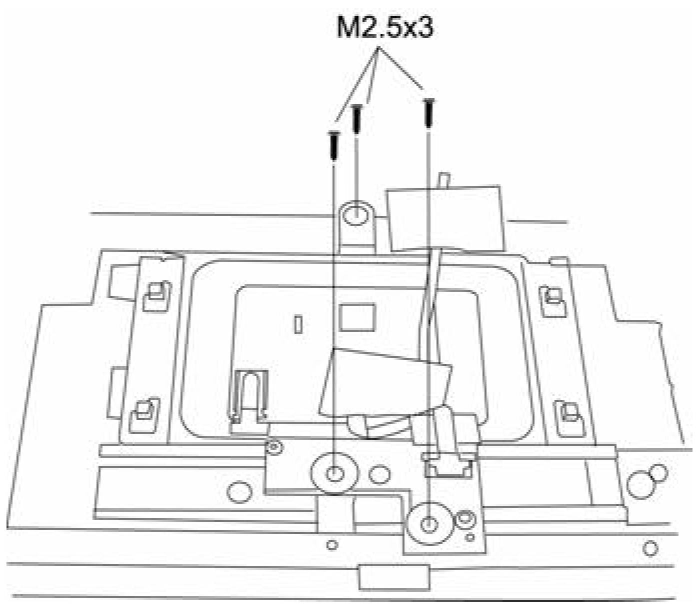


Figure 4-26 Removing the TouchPad

Installing the TouchPad

To install the TouchPad, follow the steps below and refer to the figures in the preceding section:

1. With the top cover upside down, place the TouchPad, the Track Pad Bracket, and control button board in position.
2. Secure the TouchPad Bracket with one M2.5x3 screw.
3. Secure the control button board with two M2.5x3 black screws.
4. Connect the TouchPad FFC cable to the TouchPad.

4.15 System Board

NOTE: There are two different SKUs of this model of computer – the Satellite M70 and the Satellite Pro M70. Because =there exists some difference in how the system board is uninstalled. Differences are highlighted in the procedure.

Removing the System Board

To remove the system board, first remove the top cover, then follow the steps below:

1. Remove four M2x4 screws from the Express Bracket and remove two M2.5x3 screws from the Express PC Board.

   NOTE: The Satellite Pro M70 doesn't have an Express PC Board, so skip this step.

2. Remove four M2.5x3 screws from the system board.

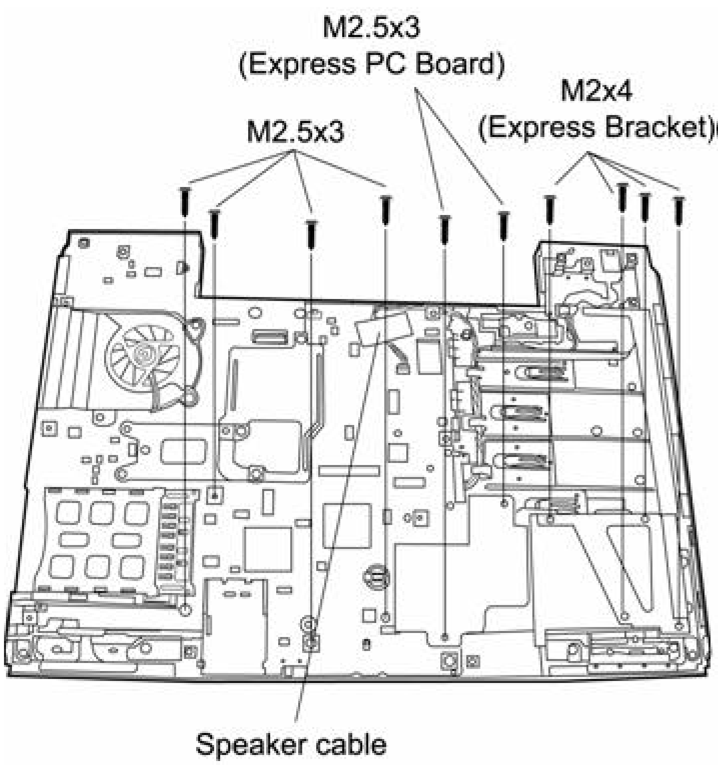


Figure 4-27 Removing the system board

NOTE: The Satellite Pro M70 only has two M2.5x3 screws.

3. Remove two hexagonal screws from the back of the system board.

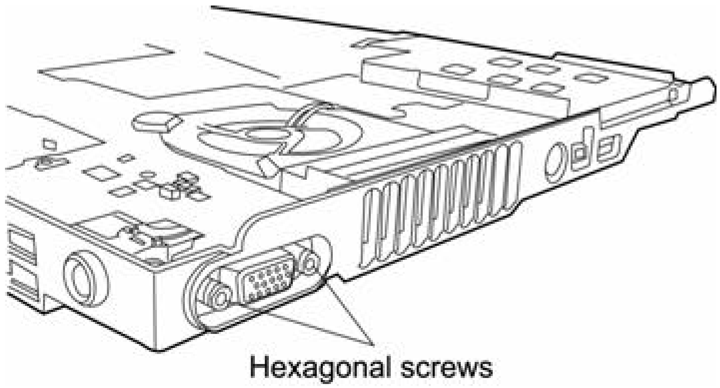


Figure 4-28 Removing the hexagonal screws

4. Disconnect the speaker cable.
5. *(Satellite Pro M70) Remove two M2.5x3 screws from the audio board, then lift it out.*

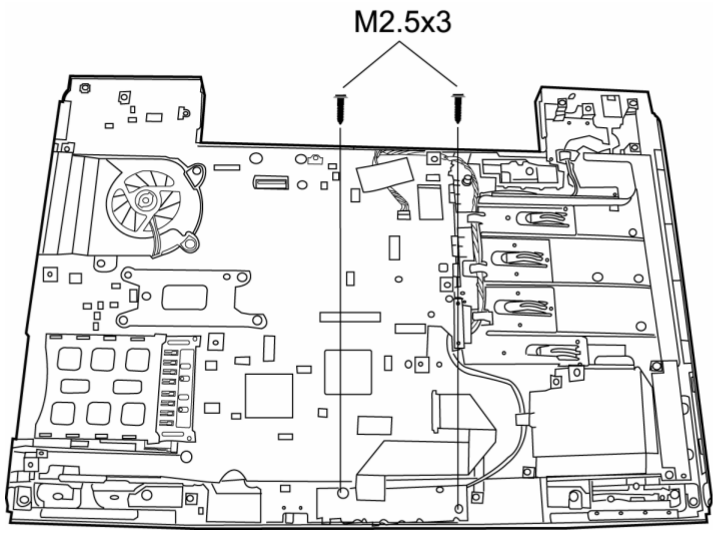


Figure 4-29 Removing the audio board

6. *(Satellite Pro M70) Remove one M2.5x3 screw and one M2.5x12 screw from the ODD board, then lift it out.*

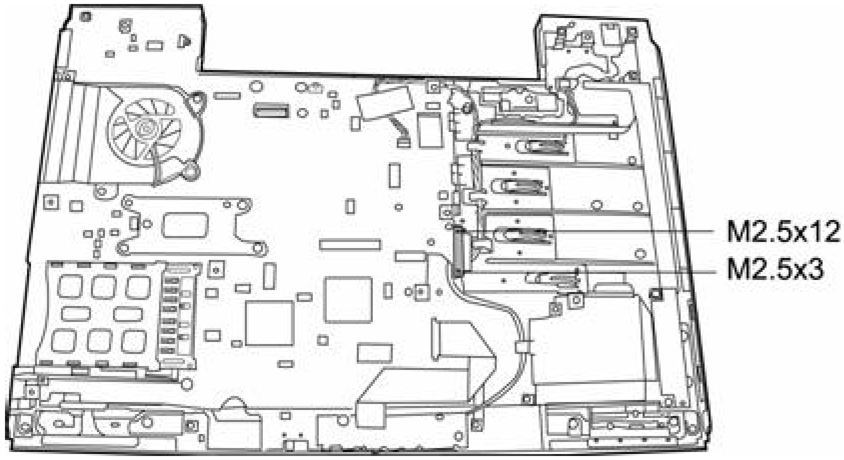


Figure 4-30 Removing the ODD board

7. *(Satellite Pro M70) Remove two M2.5x4 screws securing the fan and system board to the bottom cover chassis.*
8. Lift out the system board.

Installing the System Board

To install the system board, follow the steps below and refer to the figures in the preceding section.

1. Seat the system board in the chassis.
2. *(Satellite Pro M70)* Secure the fan and system board to the bottom cover chassis with two M2.5x4 screws.
3. *(Satellite Pro M70)* Secure the ODD board with one M2.5x3 screw and one M2.5x12 screws.
4. *(Satellite Pro M70)* Secure the audio board with two M2.5x3 screws.
5. Secure two hexagonal screws to the back of the system board.
6. Secure four M2.5x3 screws to the system board.

NOTE: The Satellite Pro M70 only has two M2.5x3 screws.

7. Secure two M2.5x3 screws to the Express PC Board and four M2x4 screws to the Express Bracket.

NOTE: The Satellite Pro M70 doesn't have an Express PC Board, so skip this step.

4.16 Speakers

Removing the Speakers

To remove the speakers, first remove the top cover, system board and then follow the steps below:

1. Remove two M2.5x3 screws from the right speaker.
2. Remove two M2.5x3 screws from the left speaker.

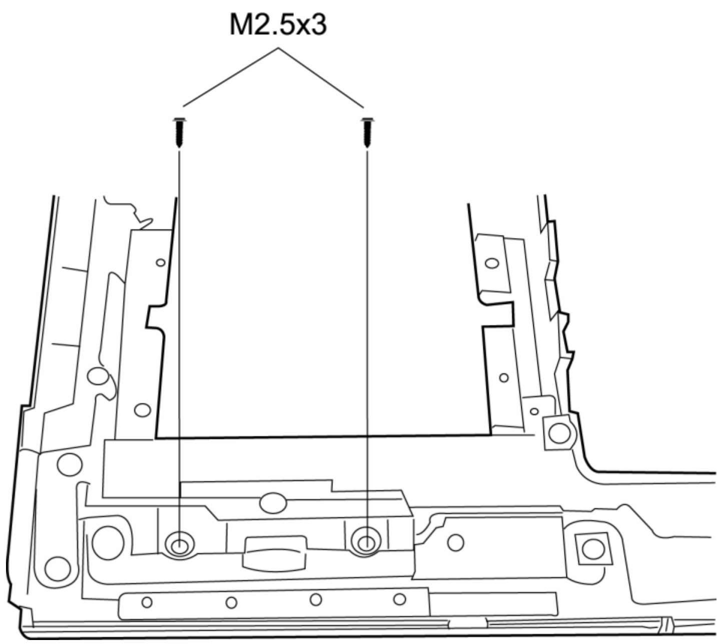


Figure 4-31 Removing the speakers

3. Lift out the speakers.

Installing the Speakers

To install the speakers, follow the steps below and refer to the figure in the preceding section:

1. Seat each speaker.
2. Secure the left speaker with two M2.5x3 screws.
3. Secure the right speaker with two M2.5x3 screws.

4.17 VGA Board

Removing the VGA Board

To remove the VGA Board, first remove the system board.

NOTE: Satellite Pro M70 does not have a VGA board to remove.

1. Remove one M2.5x3 screw from the VGA board.

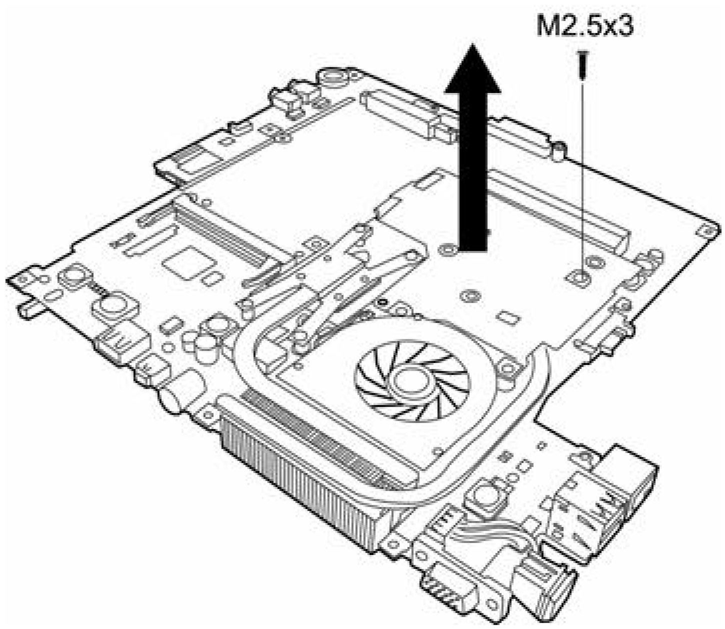


Figure 4-32 Removing the VGA Board-1

2. Disconnect the VGA board from the system board.

3. On the bottom side of the VGA board, remove three M2.5x3 screws from the VGA board heat sink, then disengage it.

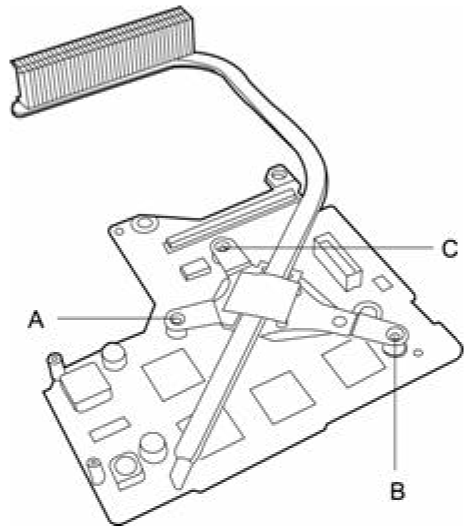


Figure 4-33 Removing the VGA Board-2

NOTE: The VGA board screws must be removed in a specific order, as shown above, to prevent causing inadvertent damage to it.

Installing the VGA Board

To install the VGA board, follow the steps below and refer to the figures in the preceding section.

1. Connect the VGA board heat sink to the bottom of the VGA board.

   NOTE: The VGA board screws must be tightened in a specific order, as shown above, to prevent causing inadvertent damage to it.

2. Attach the VGA board to the system board.

3. Secure it with one M2.5x3 screw.

4.18 Thermal Module

Removing the Thermal Module

To remove the thermal module, first remove the VGA board.

1. Remove four M2.5x3 screws from the thermal module.
2. Pry off the thermal module while being careful of the thermal grease.

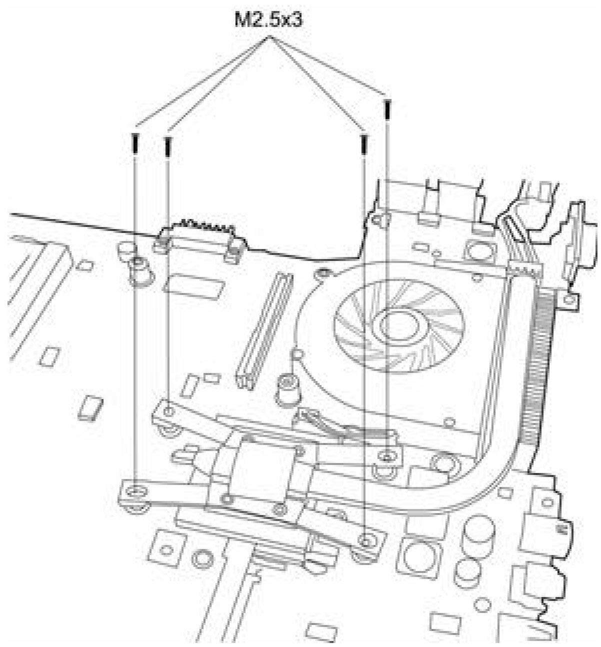


Figure 4-34 Removing the Thermal Module

NOTE: After you remove the thermal module, be sure to replace the thermal grease on the CPU when you reinstall it.

Installing the Thermal Module

To install the thermal module, follow the steps below and refer to the figures in the preceding section.

1. Restore the thermal grease to the top of the CPU.
2. Connect the thermal module, then secure it with four M2.5x3 screws.

4.19 Fan, CPU & Heat Sink

Removing the Fan, CPU & Heat Sink

To remove the Fan, Heat Sink and CPU, you must first remove the thermal module, then follow the steps below:

1. After removing the thermal module, remove the CPU by turning the marked cam to disengage the mechanism that locks the CPU in place and then lifting it out.

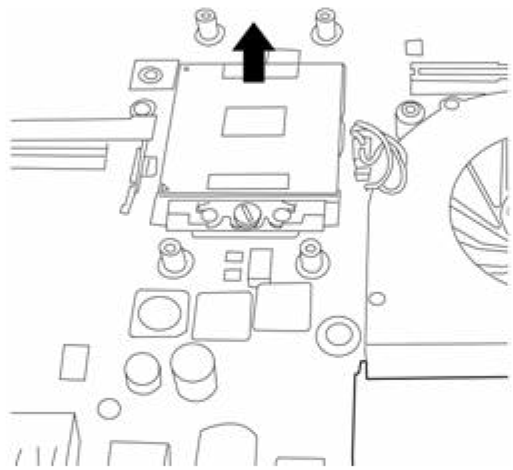


Figure 4-35 Removing the CPU

2. Disconnect the fan wire from the system board.

3. Remove two M2.5x6 fan screws from the top of the system board and one M2.5x3 fan screw from the bottom of the system board, and then lift out the fan.

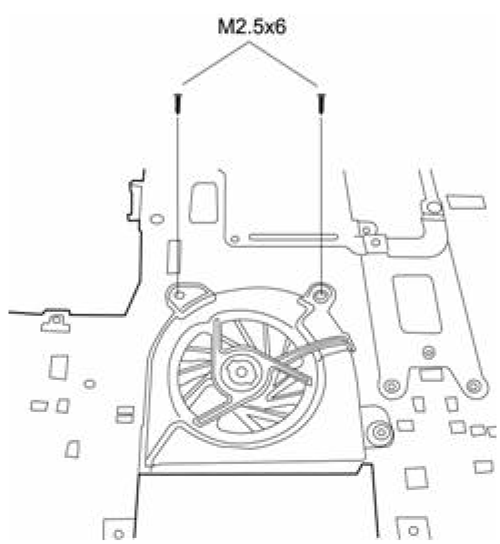


Figure 4-36 Removing the fan

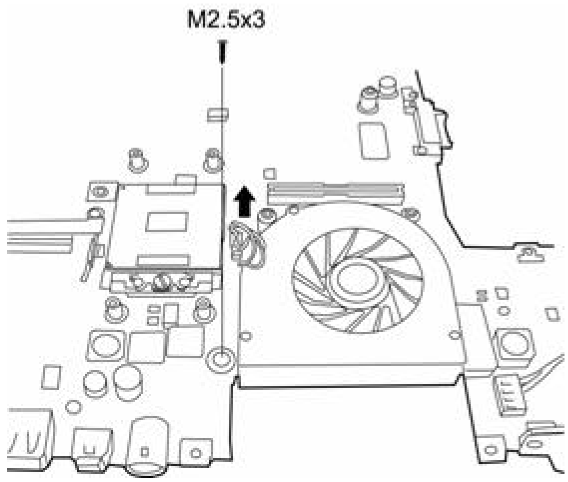


Figure 4-37 Removing the fan botton

4. On the top of the system board, remove two M2.5x3 screws from the heat sink cover.

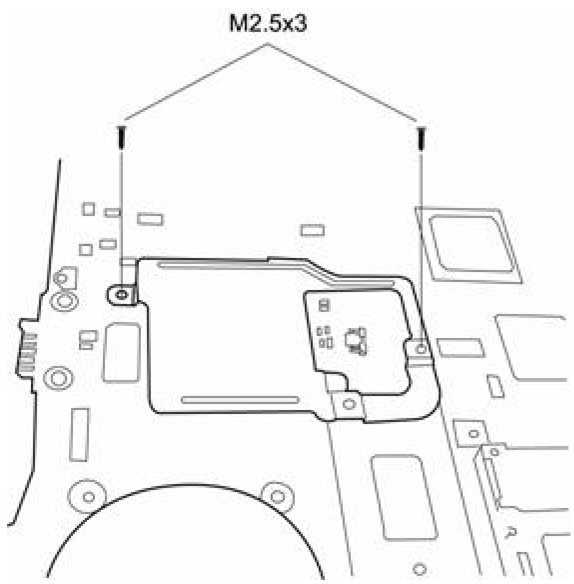


Figure 4-38 Removing the heat sink

Note: The Satellite Pro M70 places the heat sink on the bottom of the system board.

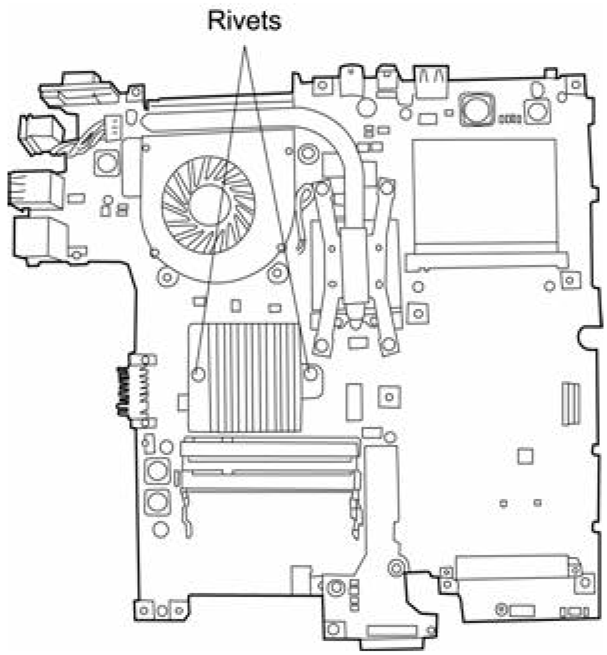


Figure 4-39 Removing the heat sink

Installing the CPU

To install the CPU, follow the steps below and refer to the figures in the preceding section.

> ***CAUTION:*** *If you remove the heat sink, you should use the CPU grease tool to remove the grease on the CPU and heat sink. Reapply fresh grease before installing the heat sink.*

1. Secure the heat sink cover with two rivets.
2. Secure the fan with two M2.5x6 fan screws on the top of the system board and one M2.5x3 fan screw on the bottom of the system board.
3. Connect the fan wire from the system board.
4. Reinstall the CPU, ensuring that you restore the thermal grease on its surface and then turn the cam back to the locked position.

4.20 Display Mask

Removing the Display Mask

To remove the display mask, first remove the display assembly as described earlier, then follow the steps below:

1. Remove the mask seals to expose four lower inner corner screws securing the display mask.
2. Remove four M2.5x6 black screws from the corners that were previously covered by the mask seals.
3. Carefully insert your fingers between the mask and the LCD panel and pry open the snaps. Start with the four snaps at the top of the display mask. Continue unsnapping the display mask along the two sides and the bottom edge to remove display.

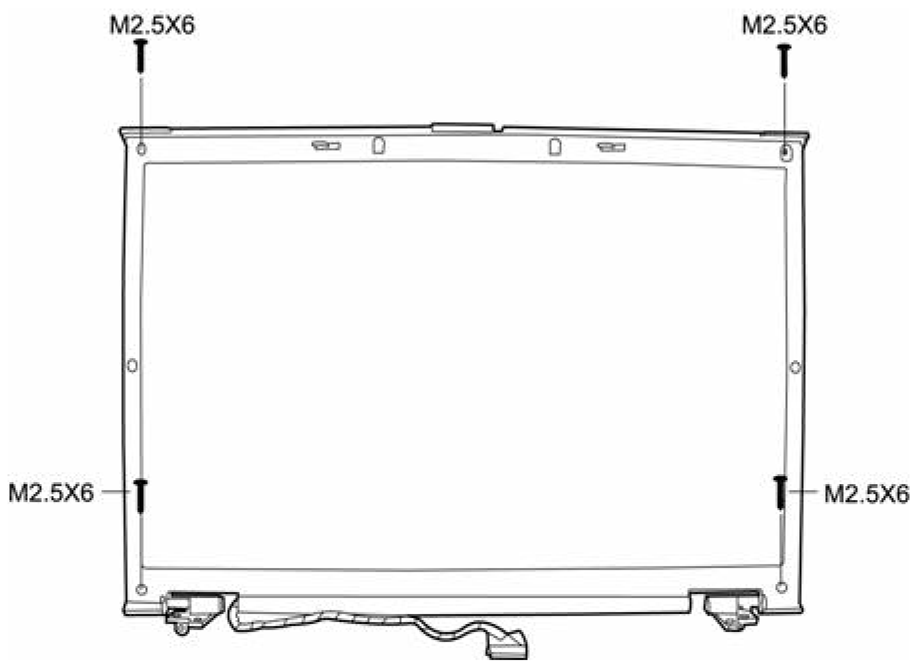


Figure 4-40 Removing the display mask

Installing the Display Mask

To install the display mask, follow the steps below and refer to the figures in the preceding section.

1. Seat the display mask and secure the snaps on each side.
2. Secure the display mask with four M2.5x6 screws at the bottom inner corner.
3. Cover the secured screws with mask seals.

4.21 LCD Module

Removing the LCD Module

To remove the LCD module, first remove the display assembly and display mask, then follow the steps below.

1. Remove one M2.5x3 black screw and one M2x3 black screw securing the LCD cable and FL inverter board.
2. Disconnect the LCD cable from the FL inverter board.
3. Remove two M2.5x6 black screws securing the LCD module bracket to LCD cover.
4. Remove eight M2x3 black screws securing the LCD module bracket to the LCD module.
5. Lift it out.

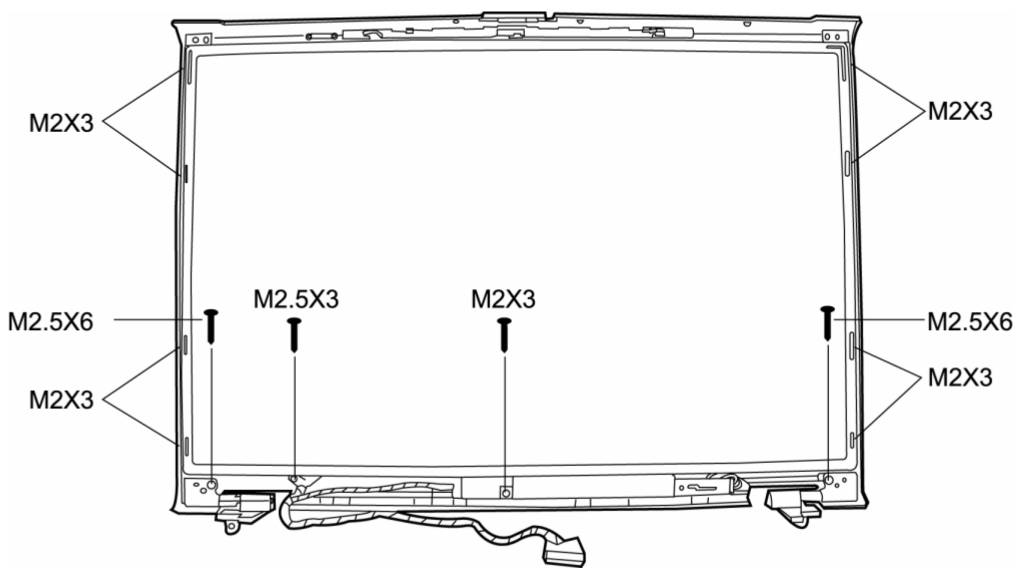


Figure 4-41 Removing the LCD module-1

> ***NOTE**: If the LCD module malfunctions, remove the LCD cable and LCD bracket. Then replace the whole LCD module unit.*

Installing the LCD Module

To install the LCD module, follow the steps below and refer to the figures in the preceding section.

1. Set the LCD module in the display assembly.
2. Connect the FL cable and the HV cable to the FL inverter board.
3. Set the LCD module in the display assembly with the LCD module bracket and eight M2x3 black screws. Secure the LCD module with two M2.5x6 black screws.
4. Secure one M2.5x3 black screw and one M2x3 black screw holding the left HV cable and FL inverter board in place.

4.22 FL Inverter Board

Removing the FL Inverter Board

To remove the FL inverter board, first remove the battery pack, the display assembly, display mask, and LCD module, then follow the steps below.

1. Remove one M2.5x3 black screw and one M2x3 black screw securing the FL invert board to the LCD display assembly.

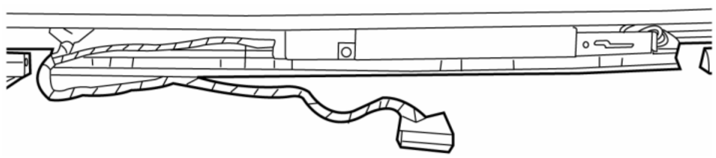


Figure 4-42 Removing the FL inverter board

Installing the FL Inverter Board

To install the FL inverter board, follow the steps below and refer to the figure in the preceding section..

1. Secure one M2.5x3 black screw and one M2x3 black screw connecting the FL inverter board to the LCD display assembly.

2. Reassemble the computer.

Appendices

Appendix Contents

Figures

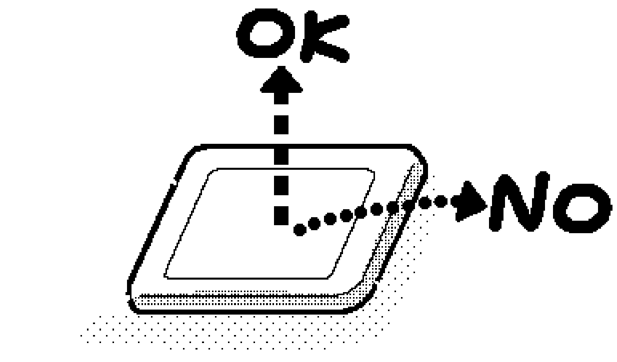
Tables

Appendix A Handling the LCD Module

Precautions for handling the LCD module

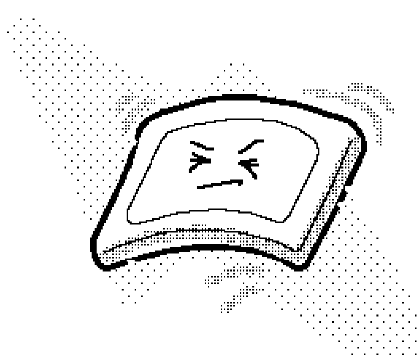
The LCD module can be easily damaged during assembly or disassembly. Therefore, please observe the following precautions when handling it:

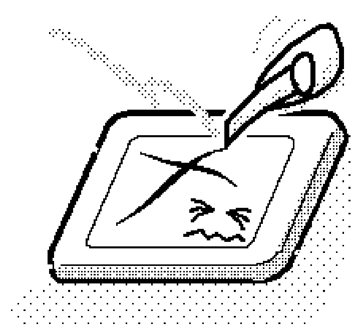
1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws.
   Do not force the module into place, because stress can affect its performance.

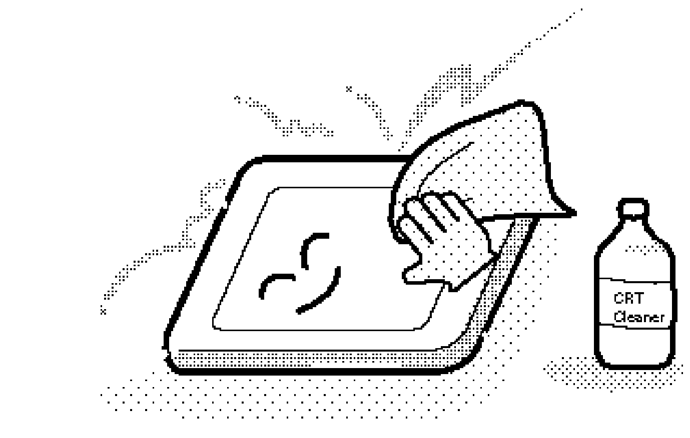
   Note: The panel's polarized surface is easily scarred, so handle it carefully.



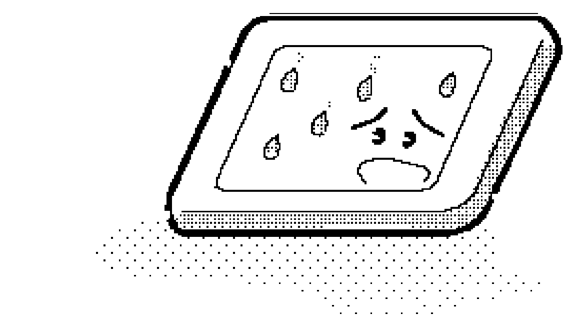


3. If the panel’s surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

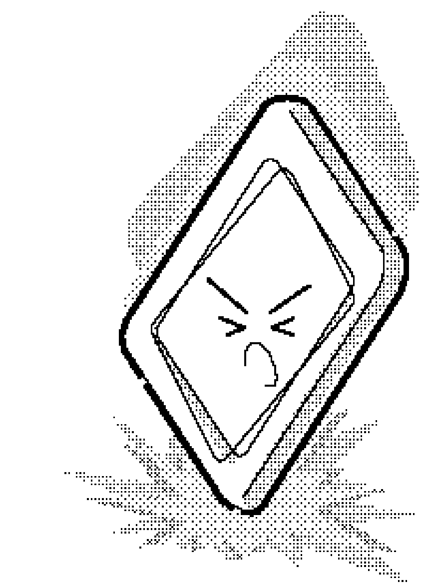
   If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel’s surface. Do not apply cleanser directly to the panel.



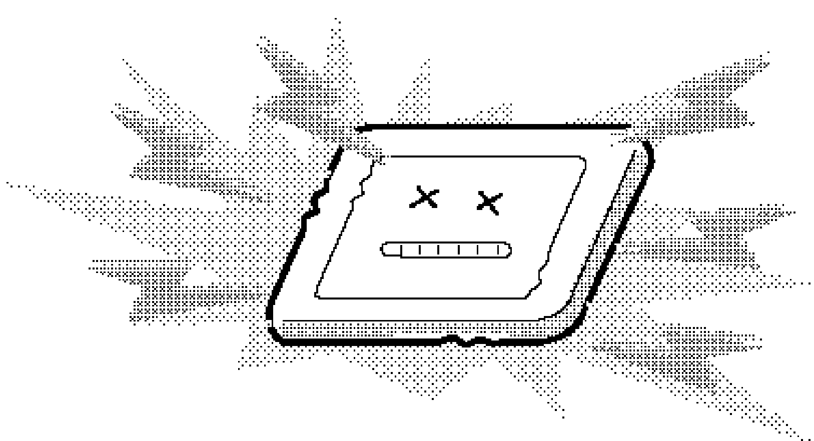
4. If water or other liquid is left on the panel’s surface for a long period, it can change the screen’s tint or stain it. Be sure to quickly wipe off any liquid.



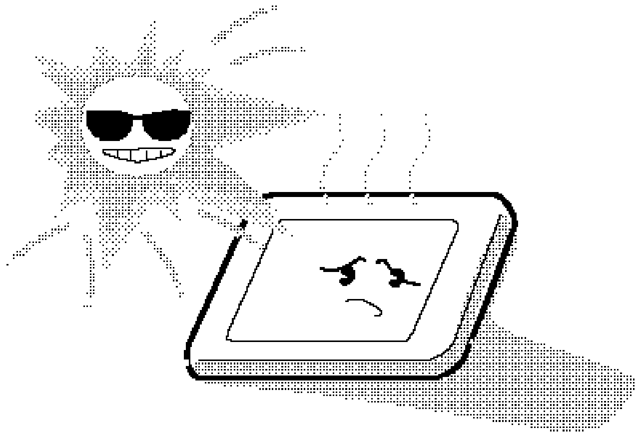
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



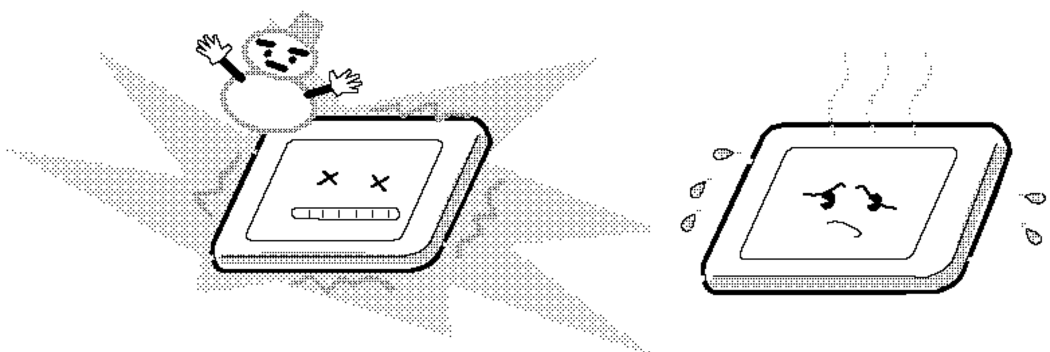
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



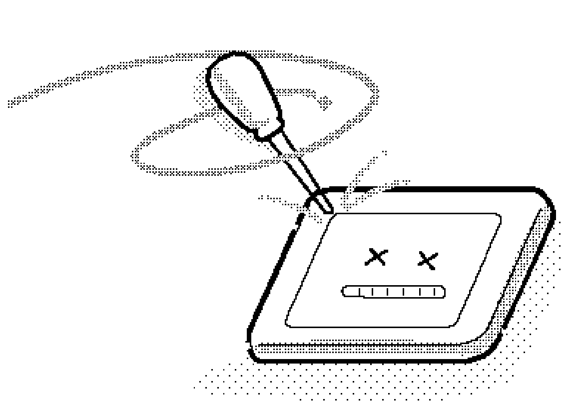
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



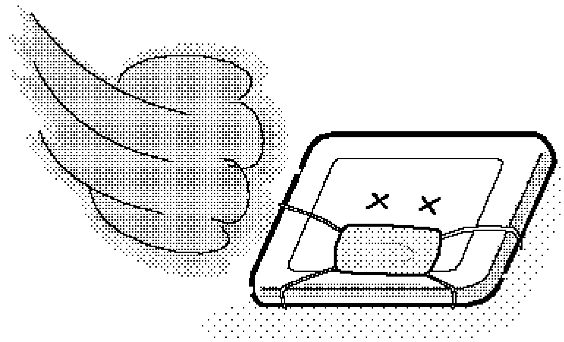
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.

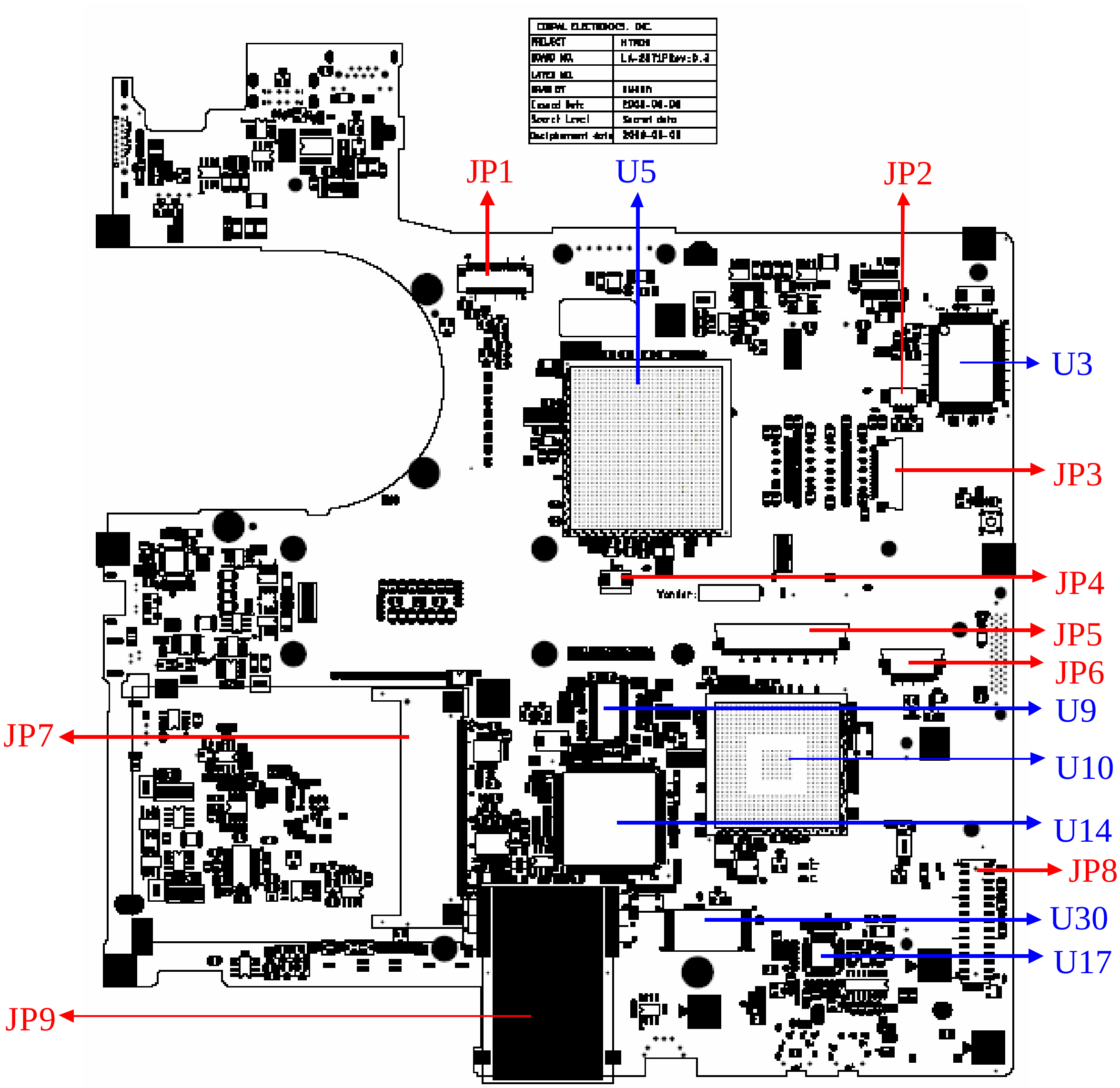


10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.



Appendix B Board Layout

B.1 System Board (FRDSY*) Top View



B.2 System Board (FRDSY*) Button View

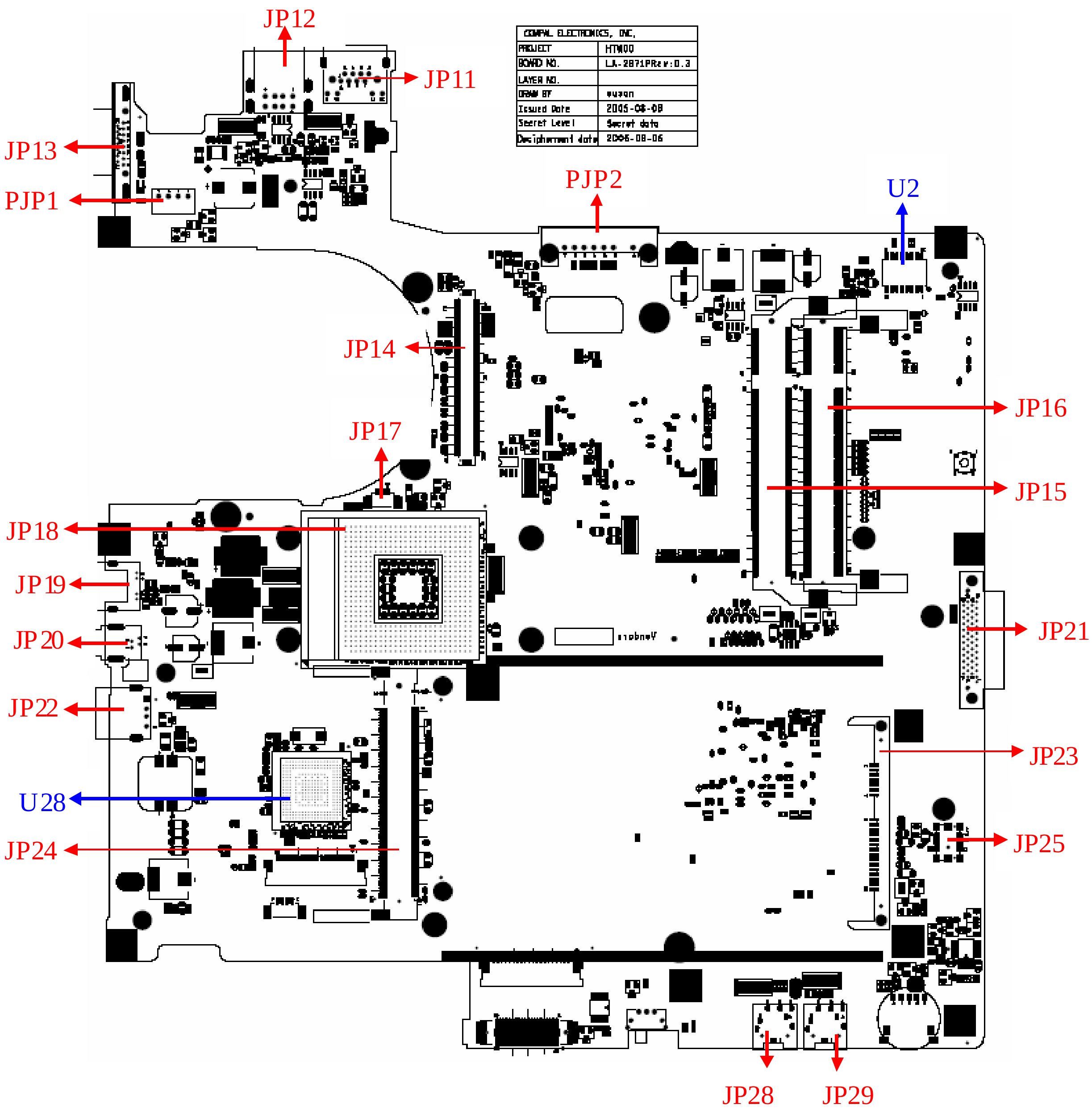


Table B-1 System board connectors (top and bottom)

Number	Name
JP1	LCD conn
JP2	Speaker conn
JP3	SW/LED conn
JP4	TP conn
JP5	Keyboard conn
JP6	Bluetooth conn
JP7	Cardbus Socket
JP8	New card connector
JP9	5 in 1 conn
JP11 JP12	LAN connecto USB conn1,2
JP13	CRT conn
JP14	VGA board Conn
JP15,16	DDR2 conn
JP17	FAN conn
JP18	CPU conn
JP19	TV-OUT conn
JP20	1394 conn
JP21	DVD-ROM conn
JP22	USB conn3
JP23 JP24	SATA HDD conn MINI PCI
JP25	MDC conn
JP28	Microphone in jack
JP29	Headphone out jack
PJP1	Power core conn
PJP2	Battery conn

Table B-2 System board ICs (top and bottom)

Number	**Name**
U2	LAN transformer
U3	LAN RTL8100CL
U5	North bridge 915GM or 915PM
U9	ICS951402AGT
U10	South bridge ICH6
U14	KB910
U17	AC97 Codec_ALC250&MDC
U28	PCI 7411 or PCI4510
U30	BIOS RAM_SST39VF080-70

Appendix C Pin Assignments

System Board

C.1 JP15,JP16

Table C-1 SODIMM I/F pin assignments (200-PIN) (1/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	VREF	O	2	VSS	O
3	VSS	O	4	DQ4	I/O
5	DQ0	I/O	6	DQ5	I/O
7	DQ1	I/O	8	VSS	O
9	VSS	O	10	DM0	I/O
11	DQS0#	I/O	12	VSS	O
13	DQS0	I/O	14	DQ6	I/O
15	VSS	O	16	DQ7	I/O
17	DQ2	I/O	18	VSS	O
19	DQ3	I/O	20	DQ12	I/O
21	VSS	O	22	DQ13	I/O
23	DQ8	I/O	24	VSS	I/O
25	DQ9	I/O	26	DM1	O
27	VSS	O	28	VSS	O
29	DQS1#	I/O	30	CK0	I/O
31	DQS1	I/O	32	CK0#	I/O
33	VSS	O	34	VSS	O
35	DQ10	I/O	36	DQ14	I/O
37	DQ11	I/O	38	DQ15	I/O
39	VSS	O	40	VSS	O
41	VSS	O	42	VSS	O
43	DQ16	I/O	44	DQ20	I/O
45	DQ17	I/O	46	DQ21	I/O
47	VSS	O	48	VSS	O
49	DQS2#	I/O	50v	NC	-

Table C-1 SODIMM I/F pin assignments (200-PIN) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
51	DQS2	I/O	52	DM2	I/O
53	VSS	O	54	VSS	O
55	DQ18	I/O	56	DQ22	I/O
57	DQ19	I/O	58	DQ23	I/O
59	VSS	O	60	VSS	O
61	DQ24	I/O	62	DQ28	I/O
63	DQ25	I/O	64	DQ29	I/O
65	VSS	O	66	VSS	O
67	DM3	I/O	68	DQS3#	I/O
69	NC	-	70	DQS3	I/O
71	VSS	O	72	VSS	O
73	DQ26	I/O	74	DQ30	I/O
75	DQ27	I/O	76	DQ31	I/O
77	VSS	O	78	VSS	O
79	CKE0	I/O	80	NC/CKE1	I/O
81	VDD	O	82	VDD	O
83	NC	-	84	NC/A15	-
85	BA2	I/O	86	NC/A14	-
87	VDD	O	88	VDD	O
89	A12	I/O	90	A11	I/O
91	A9	I/O	92	A7	I/O
93	A8	I/O	94	A6	I/O
95	VDD	O	96	VDD	O
97	A5	I/O	98	A4	I/O
99	A3	I/O	100	A2	I/O
101	A1	I/O	102	A0	I/O
103	VDD	O	104	VDD	O
105	A10/AP	I/O	106	BA1	I/O
107	BAD	I/O	108	RAS#	I/O
109	WE#	I/O	110	S0#	I/O
111	VDD	O	112	VDD	O
113	CAS#	I/O	114	ODT0	I/O

Table C-1 SODIMM I/F pin assignments (200-PIN) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
115	NC/S1#	I/O	116	NC/A13	I/O
117	VDD	O	118	VDD	O
119	NC/ODT1	I/O	120	NC	-
121	VSS	O	122	VSS	O
123	DQ32	I/O	124	DQ36	I/O
125	DQ33	I/O	126	DQ37	I/O
127	VSS	O	128	VSS	O
129	DQS4#	I/O	130	DM4	I/O
131	DQS4	I/O	132	VSS	O
133	VSS	O	134	DQ38	I/O
135	DQ34	I/O	136	DQ39	I/O
137	DQ35	I/O	138	VSS	O
139	VSS	O	140	DQ44	I/O
141	DQ40	I/O	142	DQ45	I/O
143	DQ41	I/O	144	VSS	O
145	VSS	O	146	DQS5#	I/O
147	DM5	I/O	148	DQS5	I/O
149	VSS	O	150	VSS	O
151	DQ42	I/O	152	DQ46	I/O
153	DQ43	I/O	154	DQ47	I/O
155	VSS	O	156	VSS	O
157	DQ48	I/O	158	DQ52	I/O
159	DQ49	I/O	160	DQ53	I/O
161	VSS	O	162	VSS	O
163	NC,TEST	-	164	CK1	I/O
165	VSS	O	166	CK1#	I/O
167	DQS6#	I/O	168	VSS	O
169	DQS6	I/O	170	DM6	I/O
171	VSS	O	172	VSS	O
173	DQ50	I/O	174	DQ54	I/O
175	DQ51	I/O	176	DQ55	I/O
177	VSS	O	178	VSS	O
179	DQ56	I/O	180	DQ60	I/O

Table C-1 SODIMM I/F pin assignments (200-PIN) (4/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
181	DQ57	I/O	182	DQ61	I/O
183	VSS	O	184	VSS	O
185	DM7	I/O	186	DQS7#	I/O
187	VSS	O	188	DQS7	I/O
189	DQ58	I/O	190	VSS	O
191	DQ59	I/O	192	DQ62	I/O
193	VSS	O	194	DQ63	I/O
195	SDA	I/O	196	VSS	O
197	SLC	I/O	198	SA0	O
199	VDDSPD	O	200	SA1	O

C.2 JP13

Table C-2 RGB I/F pin assignments (15-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	CRT_R_L	O	2	CRT_G_L	O
3	CRT_B_L	O	4	GND	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	+CRT_VCC	-	10	GND	-
11	NC	-	12	DSUB_12	I/O
13	CRT_HSYNC_L	O	14	CRT_VSYNC_L	O
15	DSUB_15	I/O			

C.3 JP23

Table C-3 HDD I/F pin assignments (44-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	A+	
3	A-		4	GND	
5	B-		6	B+	
7	GND		8	VCC3.3	
9	VCC3.3		10	VCC3.3	
11	GND		12	GND	
13	GND		14	VCC5	
15	VCC5		16	VCC5	
17	GND		18	NC	
19	GND		20	NC	
21	NC		22	NC	-

C.4 JP21

Table C-4 ODD I/F pin assignments (52-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	INT_CD_L	I	2	INT_CD_R	I
3	CD_AGND	-	4	NC	-
5	IDE_ODDRST#	O	6	IDE_DD8	I/O
7	IDE_DD7	I/O	8	IDE_DD9	I/O
9	IDE_DD6	I/O	10	IDE_DD10	I/O
11	IDE_DD5	I/O	12	IDE_DD11	I/O
13	IDE_DD4	I/O	14	IDE_DD12	I/O
15	IDE_DD3	I/O	16	IDE_DD13	I/O
17	IDE_DD2	I/O	18	IDE_DD14	I/O
19	IDE_DD1	I/O	20	IDE_DD15	I/O
21	IDE_DD0	I/O	22	IDE_DDREQ	I
23	GND	-	24	IDE_DIOR#	O
25	IDE_DIOW#	O	26	GND	O
27	IDE_DIORDY	I	28	IDE_DDACK#	O
29	IDE_IRQ	I	30	NC	O
31	IDE_DA1	O	32	+5VCD	I
33	IDE_DA0	O	34	IDE_DA2	I
35	IDE_DCS1#	O	36	IDE_DCS3#	-
37	SHDD_LED#	I	38	+5VCD	O
39	+5VS	-	40	+5VCD	-
41	+5VS	-	42	+5VCD	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	SD_CSEL	-	48	GND	-
49	NC	-	50	NC	-
51	NC		52	NC	

C.5 JP7

Table C-5 PC Card I/F pin assignments (68-pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	35	GND	-
2	S1_D3	I/O	36	S1_CD1#	O
3	S1_D4	I/O	37	S1_D11	I/O
4	S1_D5	I/O	38	S1_D12	I/O
5	S1_D6	I/O	39	S1_D13	I/O
6	S1_D7	I/O	40	S1_D14	I/O
7	S1_CE1#	I/O	41	S1_D15	I/O
8	S1_A10	I	42	S1_CE2#	I/O
9	S1_OE#	I/O	43	S1_VS1	I
10	S1_A11	I	44	S1_IORD#	I/O
11	S1_A9	I	45	S1_IOWR#	I
12	S1_A8	I	46	S1_A17	I
13	S1_A13	I	47	S1_A18	I
14	S1_A14	I	48	S1_A19	I
15	S1_WE#	I	49	S1_A20	I
16	S1_RDY#	O	50	S1_A21	I
17	+S1_VCC	-	51	+S1_VCC	-
18	+S1_VPP	-	52	+S1_VPP	-
19	S1_A16	I	53	S1_A22	I
20	S1_A15	I	54	S1_A23	I
21	S1_A12	I	55	S1_A24	I
22	S1_A7	I	56	S1_A25	I
23	S1_A6	I	57	S1_VS2	I
24	S1_A5	I	58	S1_RST	I
25	S1_A4	I	59	S1_WAIT#	I
26	S1_A3	I	60	S1_INPACK#	O
27	S1_A2	I	61	S1_REG#	I
28	S1_A1	I	62	S1_BVD2	O
29	S1_A0	I	63	S1_BVD1	I
30	S1_D0	I	64	S1_D8	I/O

Table C-5 PC Card I/F pin assignments (88-pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
31	S1_D1	I/O	65	S1_D9	I/O
32	S1_D2	I/O	66	S1_D10	I/O
33	S1_WP	I/O	67	S1_CD2#	I
34	GND	-	68	GND	-

C.6 JP24

Table C-6 Mini PCI I/F pin assignments (126-pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	NC	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	SWITCH	O	14	NC	-
15	NC	-	16	NC	-
17	PCI_PIRQH#	I	18	+5VS	-
19	+3V	O	20	PCI_PIRQG#	I
21	NC	-	22	NC	-
23	GND	-	24	+3VALW	O
25	CLK_PCL_MINI	O	26	PCI_RST#	O
27	GND	-	28	+3VS	O
29	PCI_REQ1#	I	30	PCI_GNT1#	O
31	+3V	O	32	GND	-
33	PCI_AD31	I/O	34	MINI_PME#	I
35	PCI_AD29	I/O	36	NC	-
37	GND	-	38	PCI_AD30	I/O
39	PCI_AD27	I/O	40	+3VS	O
41	PCI_AD25	I/O	42	PCI_AD28	I/O
43	NC	-	44	PCI_AD26	I/O
45	PCI_CBE3#	I/O	46	PCI_AD24	I/O
47	PCI_AD23	I/O	48	MINI_IDSEL	I/O
49	GND	-	50	GND	-
51	PCI_AD21	I/O	52	PCI_AD22	I/O
53	PCI_AD19	I/O	54	PCI_AD20	I/O
55	GND	-	56	PCI_PAR	I/O
57	PCI_AD17	I/O	58	PCI_AD18	I/O
59	PCI_CBE2#	I/O	60	PCI_AD16	I/O

Table C-6 Mini PCI I/F pin assignments (124-pin)(2/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
61	PCI_IRDY#	I/O	62	GND	-
63	+3V	O	64	PCI_FRAME#	I/O
65	PM_CLKRUN#	I/O	66	PCI_TRDY#	I/O
67	PCI_SERR#	I/O	68	PCI_STOP#	I/O
69	GND	-	70	+3VS	O
71	PCI_PERR#	O	72	PCI_DEVSEL#	I/O
73	PCI_C/BE1#	I/O	74	GND	-
75	PCI_AD14	I/O	76	PCI_AD15	I/O
77	GND	-	78	PCI_AD13	I/O
79	PCI_AD12	I/O	80	PCI_AD11	I/O
81	PCI_AD10	I/O	82	GND	-
83	GND	-	84	PCI_AD9	I/O
85	PCI_AD8	I/O	86	PCI_BE0#	I/O
87	PCI_AD7	I/O	88	+3VS	O
89	+3V	O	90	PCI_AD6	I/O
91	PCI_AD5	I/O	92	PCI_AD4	I/O
93	NC	-	94	PCI_AD2	I/O
95	PCI_AD3	I/O	96	PCI_AD0	I/O
97	+5VS	O	98	NC	-
99	PCI_AD1	I/O	100	NC	-
101	GND	-	102	GND	-
103	NC	-	104	NC	-
105	NC	-	106	NC	-
107	NC	-	108	NC	-
109	NC	-	110	NC	-
111	NC	I	112	NC	-
113	GND	-	114	GND	-
115	NC	-	116	NC	-
117	GND	-	118	GND	-
119	GND	-	120	GND	-
121	NC	-	122	NC	-
123	+5VS	-	124	+3VALW	-
125	NC		126	NC	

C.7 JP1

Pin No.	Signal name	Function
1	GND	GND
2	GND	GND
3	GMCH_TXCLK-	Panel Clock Signals
4	GND	GND
5	GMCH_TXCLK+	Panel Clock Signals
6	NC	Non-Connection
7	GND	GND
8	+VCDVDD_LCD	Power for Panel
9	GMCH_TXOUT0-	Panel Data Signals
10	+VCDVDD_LCD	Power for Panel
11	GMCH_TXOUT0+	Panel Data Signals
12	+3VS_LCD	Power for Panel
13	GND	GND
14	+3VS_LCD	Power for Panel
15	GMCH_TXOUT2-	Panel Data Signals
16	GMCH_CLD_CLK	DDC Clock
17	GMCH_TXOUT2+	Panel Data Signals
18	GMCH_CLD_DATA	DDC DATA
19	GND	GND
20	DAC_BRIG	Inverter Control signal
21	GMCH_TXOUT1-	Panel Data Signals
22	INVT_PWM	Inverter Control signal
23	GMCH_TXOUT1+	Panel Data Signals
24	DISPOFF#	LCD back light
25	GND	GND
26	NC	Non-Connection
27	GND	GND
28	INVPWR+B	Inverter Control signal
29	GND	GND
30	INVPWR+B	Inverter Control signal

C.8 JP17

Table C-8 JP8 Fan I/F pin assignments (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+FAN1_VOUT	I	2	FANSPEED1	O
3	GND	-			

C.9 PJP1

Table C-9 AC Adaptor Connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	DC_IN_S2	I	2	DC_IN_S2	-
3	GND	-	4	GND	-

C.10 JP28

Table C-10 Microphone I/F pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	MIC-1	I
3	+AUD_VREF_J	I	4	NC	-
5	NC	-	6	NC	-

C.11 JP29

Table C-11 Headphone Connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	INTSPK_L1	O
3	INTSPK_R1	O	4	NBA_PLUG	I
5	GND	-	6	NC	-

Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	‘ ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 $	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (	0A	8A	46	F0	46	*2
11	0)	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	18	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[{	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
29	\		2B	AB	5D	F0	5D	*5
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	*2
38	K	25	A5	42	F0	42	*2
39	L	26	A6	4B	F0	4B	*2
40	; :	27	A7	4C	F0	4C	*2
41	‘ “	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
44	Shift (L)	2A	AA	12	F0	12	
45	No.102 key	56	D6	61	F0	61	
46	Z	2C	AC	1A	F0	1A	
47	X	2D	AD	22	F0	22	
48	C	2E	AE	21	F0	21	
49	V	2F	AF	2A	F0	2A	
50	B	30	B0	32	F0	32	
51	N	31	B1	31	F0	31	
52	M	32	B2	3A	F0	3A	*2
53	, <	33	B3	41	F0	41	*2
54	. >	34	B4	49	F0	49	*2
55	/ ?	35	B5	4A	F0	4A	*2
57	Shift (R)	36	B6	59	F0	59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
58	Ctrl(L)	1D	9D	14	F0 14	*3
60	Alt (L)	38	B8	11	F0 11	*3
61	Space	39	B9	29	F0 29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0 11	
64	Ctrl(R)	E0 1D	E0 9D	E0 14	E0 F0 14	
75	Ins	E0 52	E0 D2	E0 70	E0 F0 70	*1
76	Del	E0 53	E0 D3	E0 71	E0 F0 71	*1
79	? ?	E0 4B	E0 CB	E0 6B	E0 F0 6B	*1
80	Home	E0 47	E0 C7	E0 6C	E0 F0 6C	*1
81	End	E0 4F	E0 CF	E0 69	E0 F0 69	*1
83	? ?	E0 48	E0 C8	E0 75	E0 F0 75	*1
84	? ?	E0 50	E0 D0	E0 72	E0 F0 72	*1
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0 7D	*1
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0 7A	*1
89	? ?	E0 4D	E0 CD	E0 74	E0 F0 74	*1
110	Esc	01	81	76	F0 76	
112	F1	3B	BB	05	F0 05	
113	F2	3C	BC	06	F0 06	
114	F3	3D	BD	04	F0 04	
115	F4	3E	BE	0C	F0 0C	
116	F5	3F	BF	03	F0 03	
117	F6	40	C0	0B	F0 0B	
118	F7	41	C1	83	F0 83	
119	F8	42	C2	0A	F0 0A	
120	F9	43	C3	01	F0 01	
121	F10	44	C4	09	F0 09	*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
122	F11	57	D7	78	F0 78	*3
123	F12	58	D8	07	F0 07	*3
124	PrintSc	*6	*6	*6	*6	*6
126	Pause	*7	*7	*7	*7	*7
X	Fn	—	—	—	—	*4
X	Win	E0 5B	E0 DB	E0 1F	E0 F0 1F	
x	App	E0 5D	E0 DD	E0 2F	E0 F0 2F	

Notes:

1. * Scan codes differ by mode.
2. * Scan codes differ by overlay function.
3. * Combination with the **Fn** key gives different codes.
4. * The **Fn** key does not generate a code by itself.
5. * This key corresponds to key No. 42 in a 102-key model.
6. * Refer to Table D-6, No. 124 key scan code.
7. * Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1		Code set 2	
		Make	**Break**	**Make**	**Break**
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12
79	? ?	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12
83	??	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12
84	??	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12
89	? ?	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12
X	Win	E0 AA E0 5B	E0 DB E0 2A	E0 F0 12 E0 1F	E0 F0 1F E0 12
X	App	E0 AA E0 5D	E0 DD E0 2A	E0 F0 12 E0 2F	E0 F0 2F E0 12

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left **Shift**	With right **Shift**
Set 1	E0 AA ____________	E0 B6
	E0 2A ____________	E0 36
Set 2	E0 F0 12__________	E0 F0 59
	E0 12_____________	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1		Code set 2	
		Make	Break	Make	Break
75	INS	E0 2A E0 52	E0 D2 E0 AA	E0 12 E0 70	E0 F0 70 E0 F0 12
76	DEL	E0 2A E0 53	E0 D3 E0 AA	E0 12 E0 71	E0 F0 71 E0 F0 12
79	? ?	E0 2A E0 4B	E0 CB E0 AA	E0 12 E0 6B	E0 F0 6B E0 F0 12
80	Home	E0 2A E0 47	E0 C7 E0 AA	E0 12 E0 6C	E0 F0 6C E0 F0 12
81	End	E0 2A E0 4F	E0 CF E0 AA	E0 12 E0 69	E0 F0 69 E0 F0 12
83	??	E0 2A E0 48	E0 C8 E0 AA	E0 12 E0 75	E0 F0 75 E0 F0 12
84	??	E0 2A E0 50	E0 D0 E0 AA	E0 12 E0 72	E0 F0 72 E0 F0 12
85	PgUp	E0 2A E0 49	E0 C9 E0 AA	E0 12 E0 7D	E0 F0 7D E0 F0 12
86	PgDn	E0 2A E0 51	E0 D1 E0 AA	E0 12 E0 7A	E0 F0 7A E0 F0 12
89	? ?	E0 2A E0 4D	E0 CD E0 AA	E0 12 E0 74	E0 F0 74 E0 F0 12
X	Win	E0 2A E0 5B	E0 DB E0 AA	E0 12 E0 1F	E0 F0 1F E0 F0 12
X	App	E0 2A E0 5D	E0 DD E0 AA	E0 12 E0 2F	E0 F0 2F E0 F0 12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	L-CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	L-ALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C6	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2	
			Make	Break	Make	Break
09	8	(8)	48	C8	75	F0 75
10	9	(9)	49	C9	7D	F0 7D
11	0	(*)	37	B7	7C	F0 7C
23	U	(4)	4B	CB	6B	F0 6B
24	I	(5)	4C	CC	73	F0 73
25	O	(6)	4D	CD	74	F0 74
26	P	(–)	4A	CA	7B	F0 7B
37	J	(1)	4F	CF	69	F0 69
38	K	(2)	50	D0	72	F0 72
39	L	(3)	51	D1	7A	F0 7A
40	;	(+)	4E	CE	79	F0 79
52	M	(0)	52	D2	70	F0 70
54	.	(.)	53	D3	71	F0 71
55	/	(/)	E0 35	E0 B5	E0 4A	E0 F0 4A

Table D-6 No.124 key scan code

Key top	Shift	Code set 1		Code set 2	
		Make	Break	Make	Break
Prt Sc	Common	E0 2A E0 37	E0 B7 E0 AA	E0 12 E0 7C	E0 F0 7C E0 F0 12
	Ctrl ?	E0 37	E0 B7	E0 7C	E0 F0 7C
	Shift ?	E0 37	E0 B7	E0 7C	E0 F0 7C
	Alt ?	54	D4	84	F0 84

Table D-7 No.126 key scan code

Key top	Shift	Code set 1	Code set 2
		Make	Make
Pause	Common	E1 1D 45 E1 9D C5	E1 14 77 E1 F0 14 F0 77
	Ctrl	E0 46 E0 C6	E0 7E E0 F0 7E

*: This key generates only make codes.

Appendix E Key Layout

E.1 United States (US) Keyboard

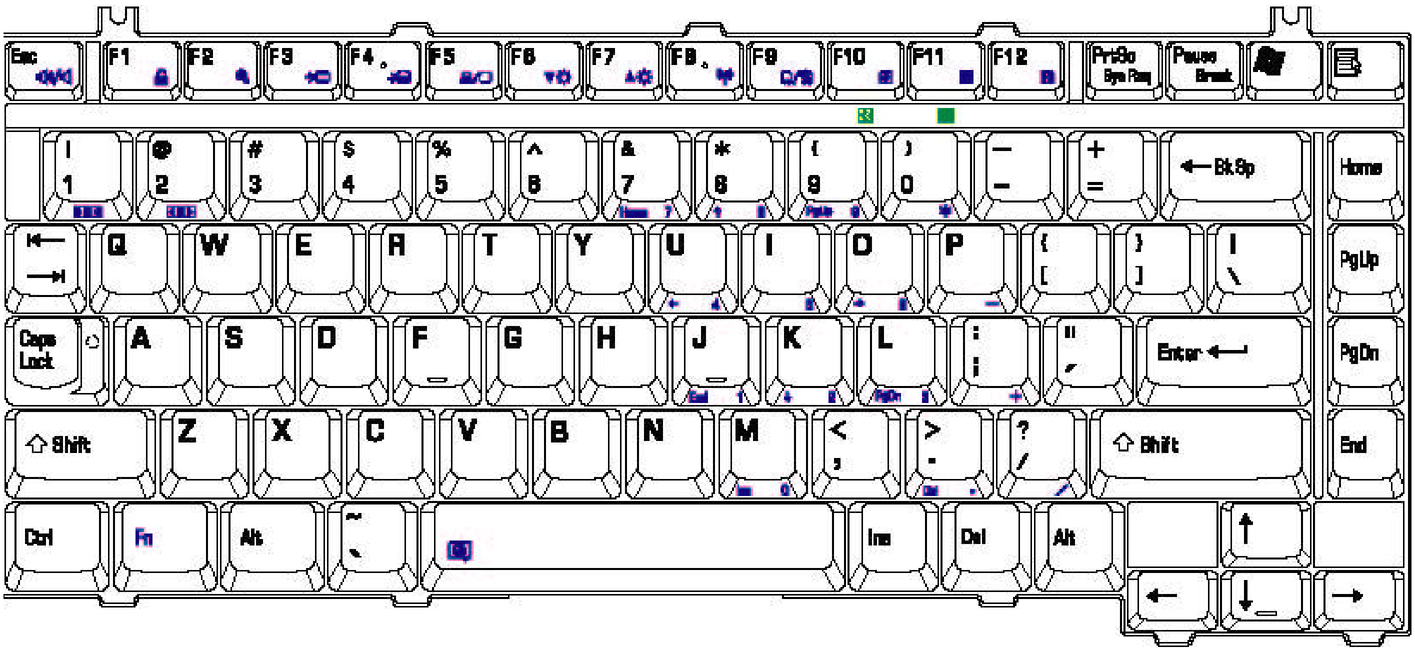


Figure E-1 US keyboard

E.2 United Kingdom (UK) Keyboard

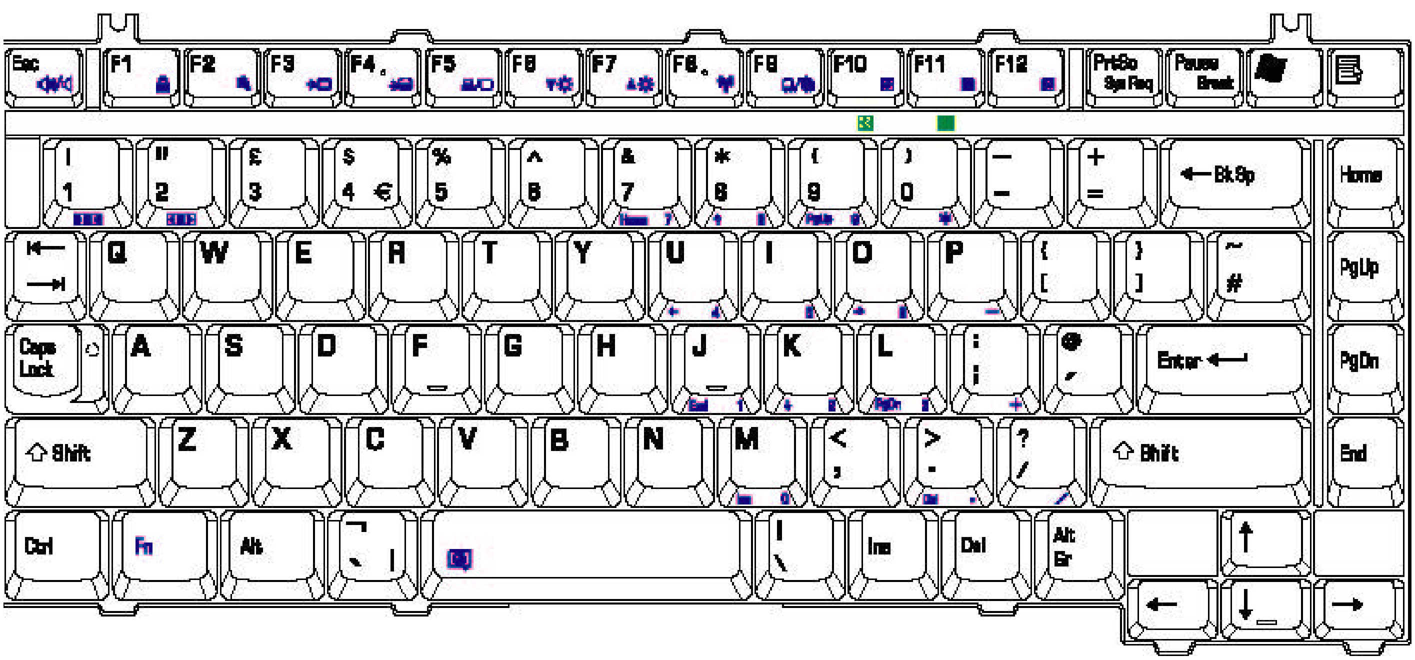


Figure E-2 UK keyboard

E.3 Spanish (SP) Keyboard

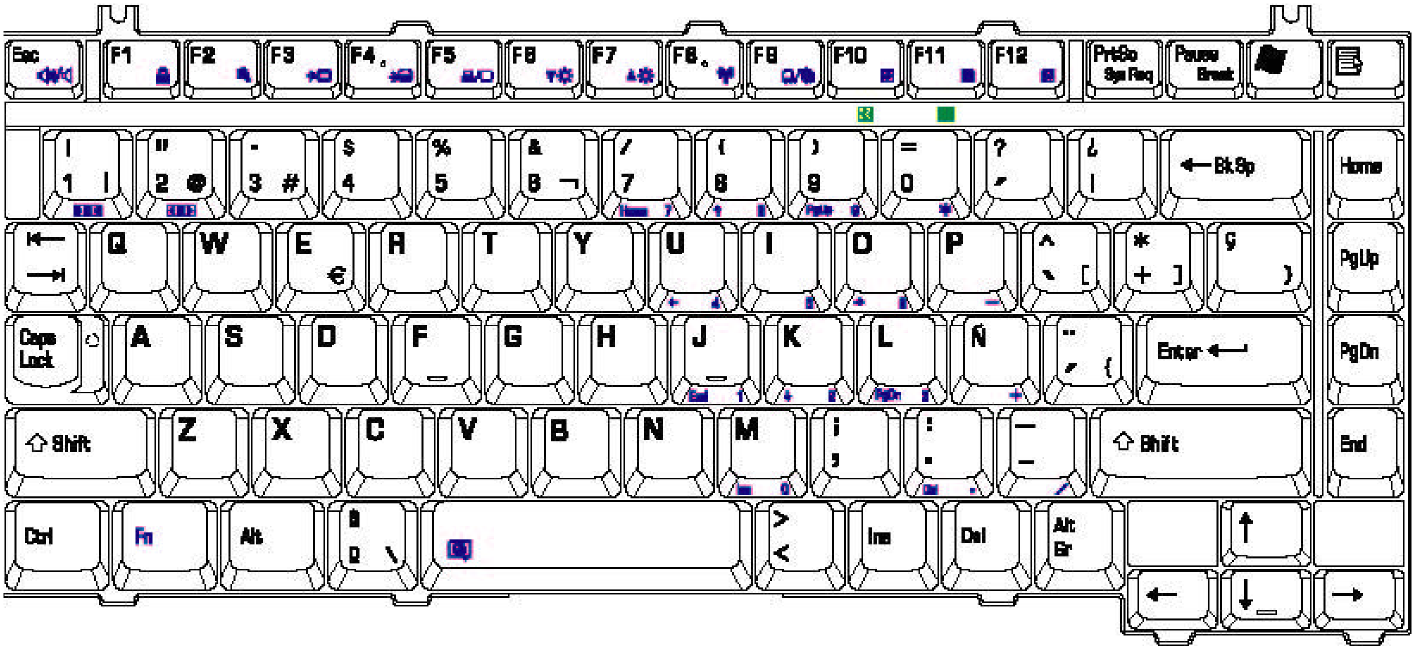


Figure E-3 SP keyboard

E.4 Japanese (JA) Keyboard

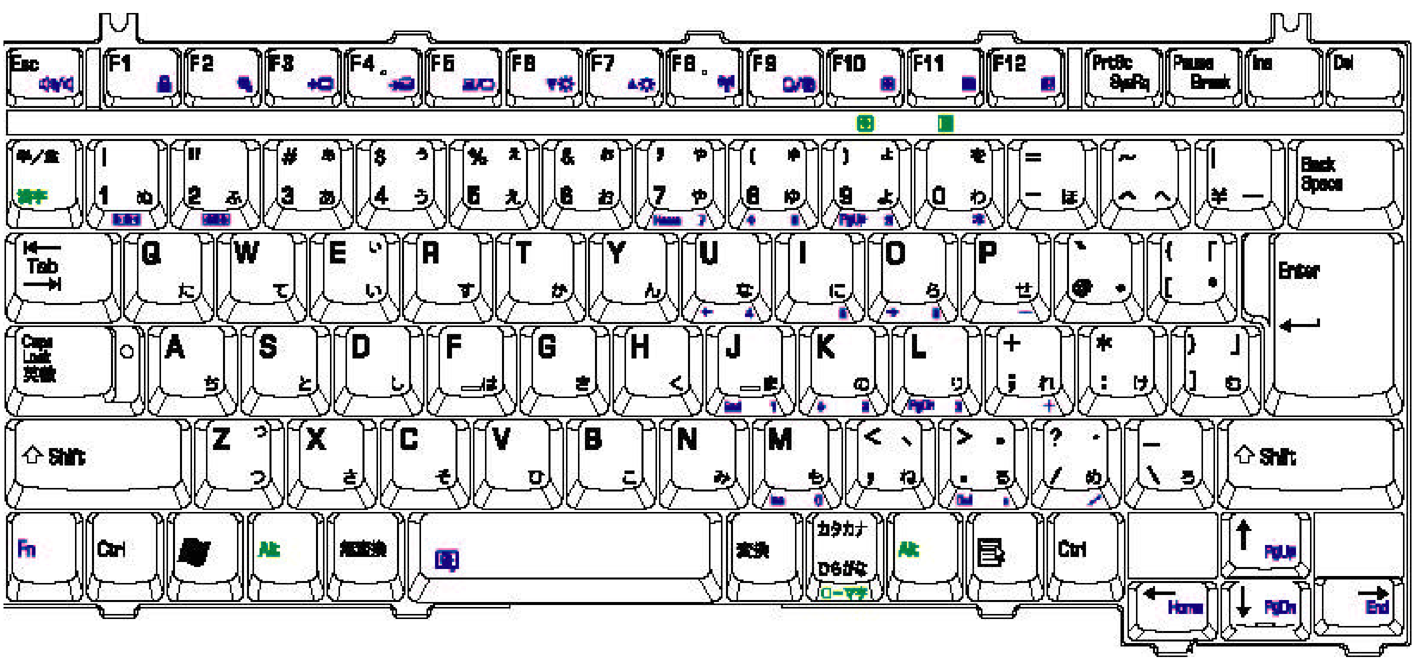


Figure E-4 JA keyboard

E.5 Korean (KO) Keyboard

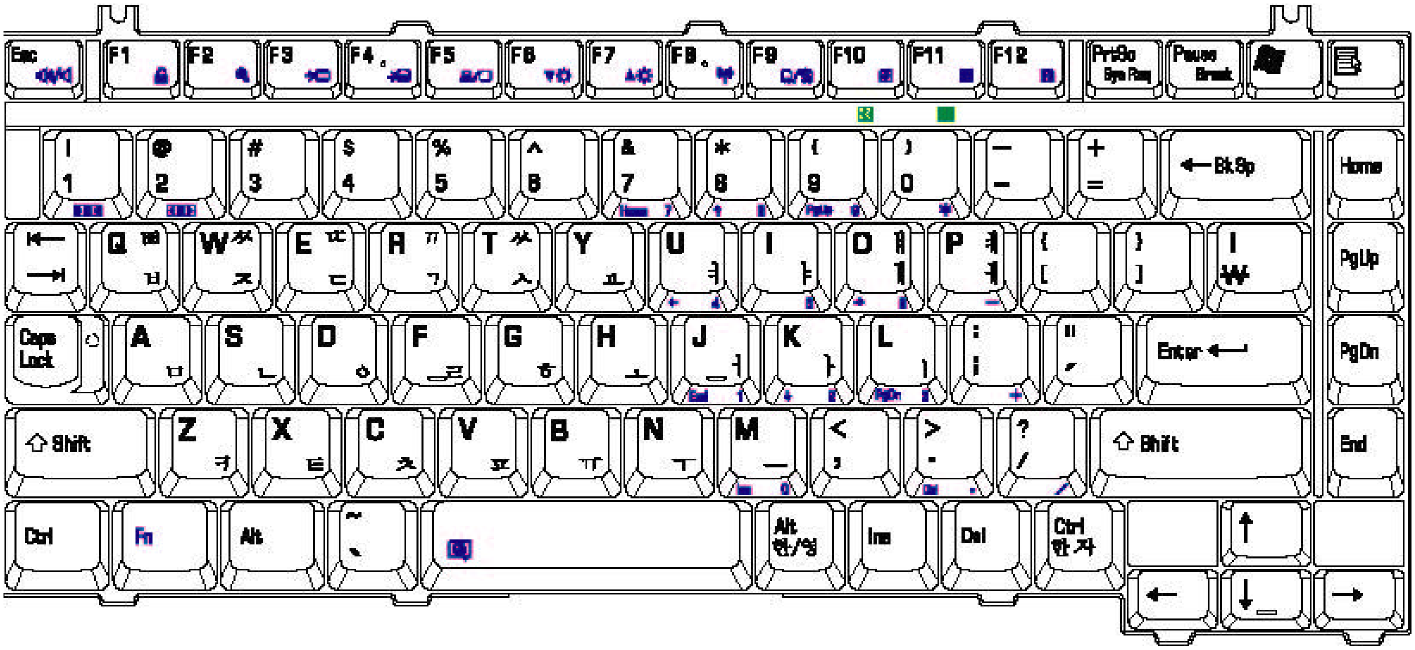


Figure E-5 KO keyboard

E.6 Canada France (CF) Keyboard

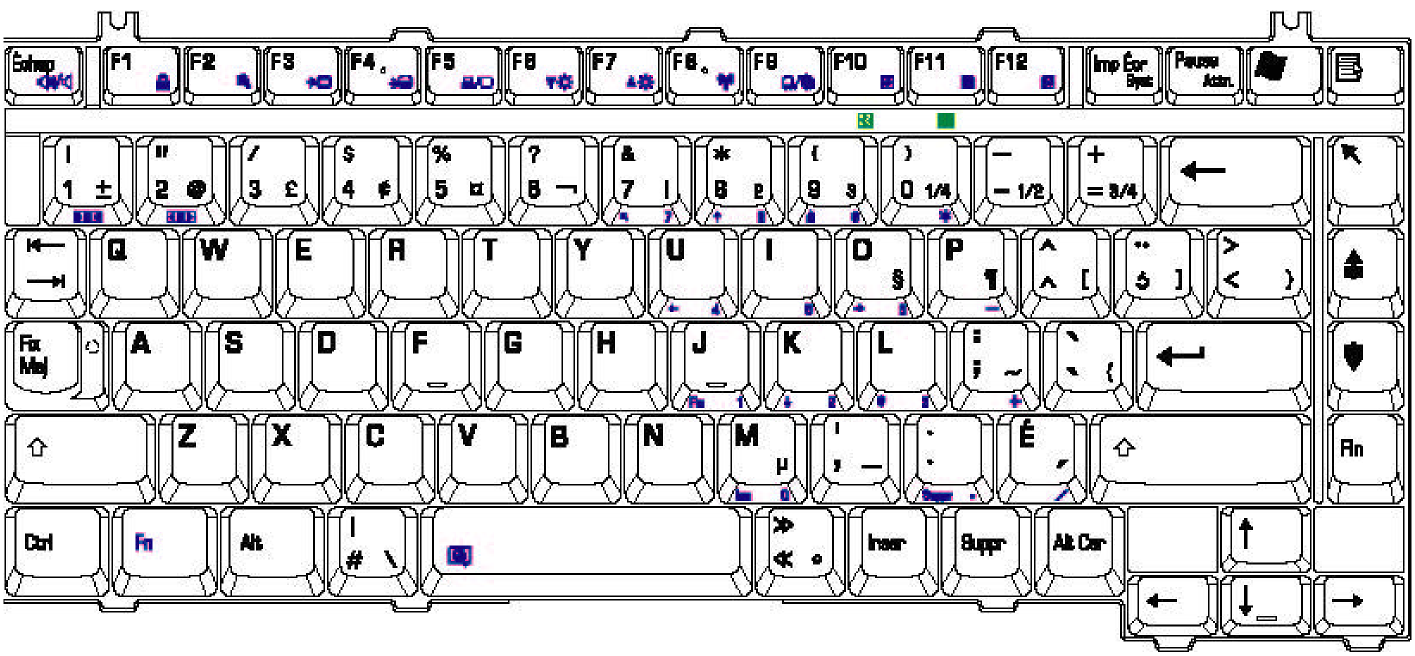


Figure E-6 CF keyboard

E.7 Portuguese (PO) Keyboard

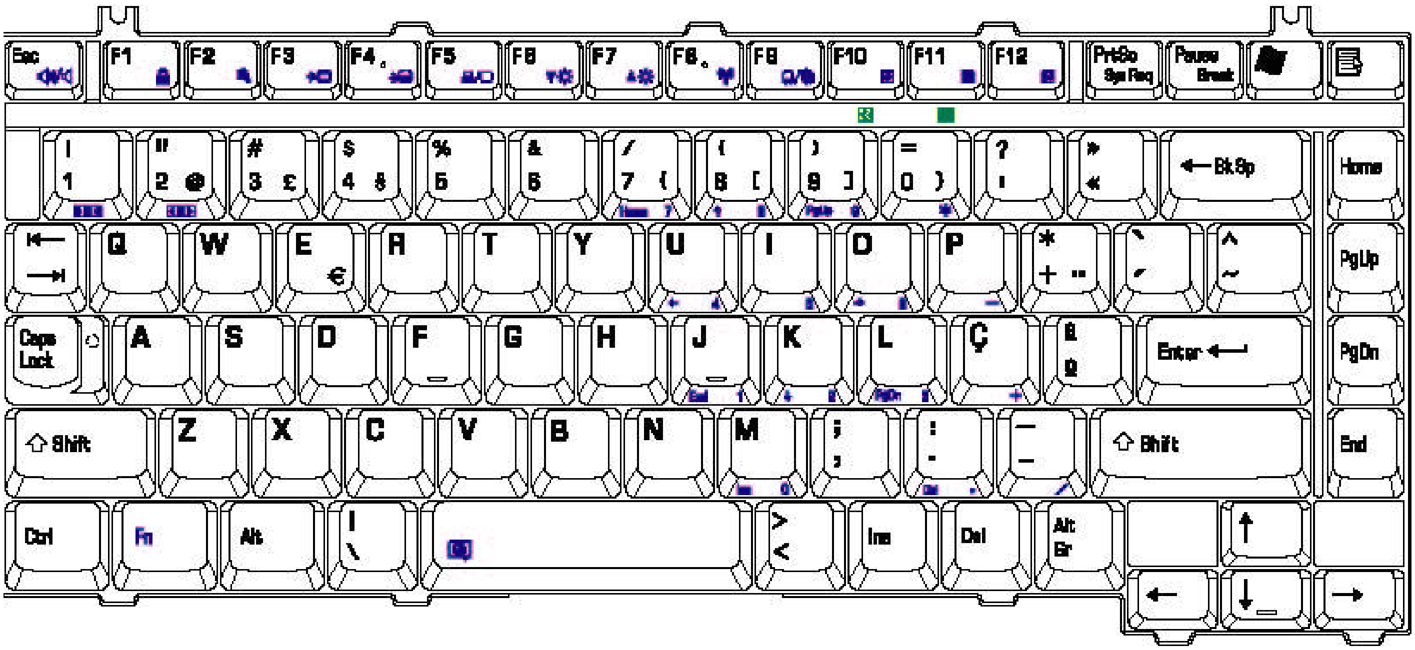


Figure E-7 PO keyboard

E.8 US-INTE (UI/INTE) Keyboard

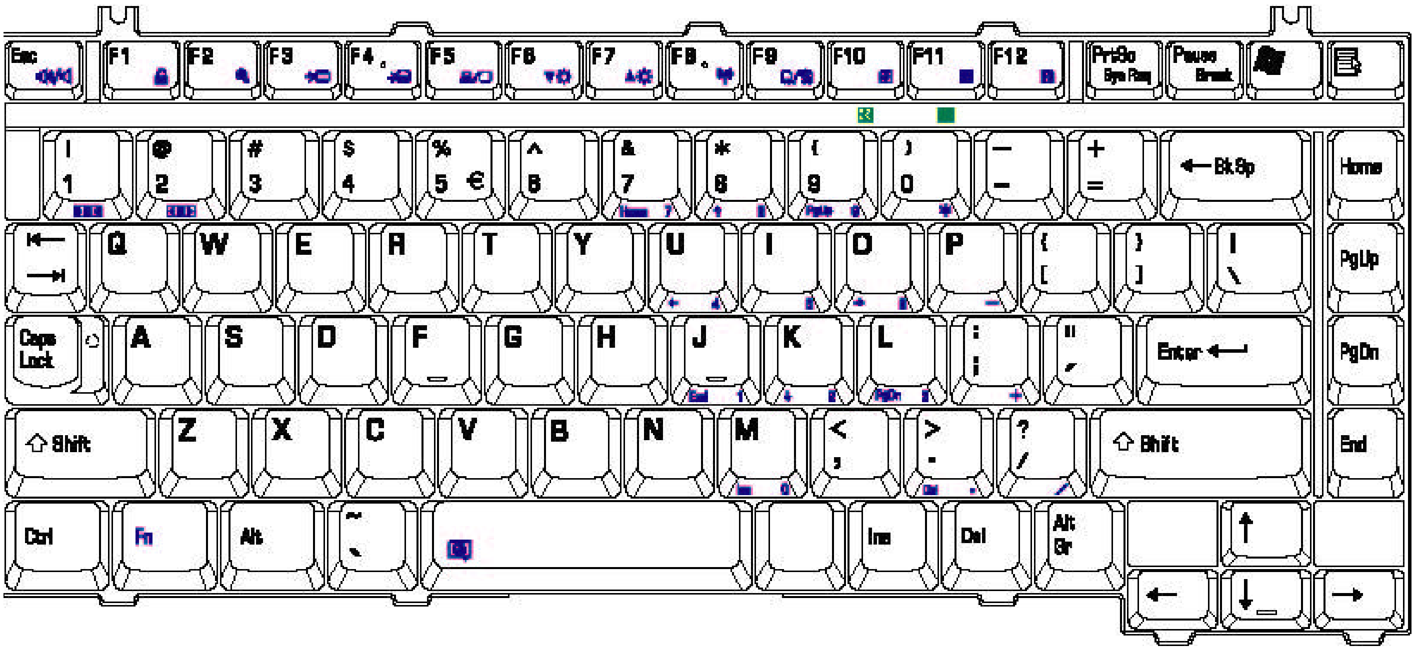


Figure E-8 U S-INTE_ALPS Keyboard

E.9 Germanic (GR) Keyboard

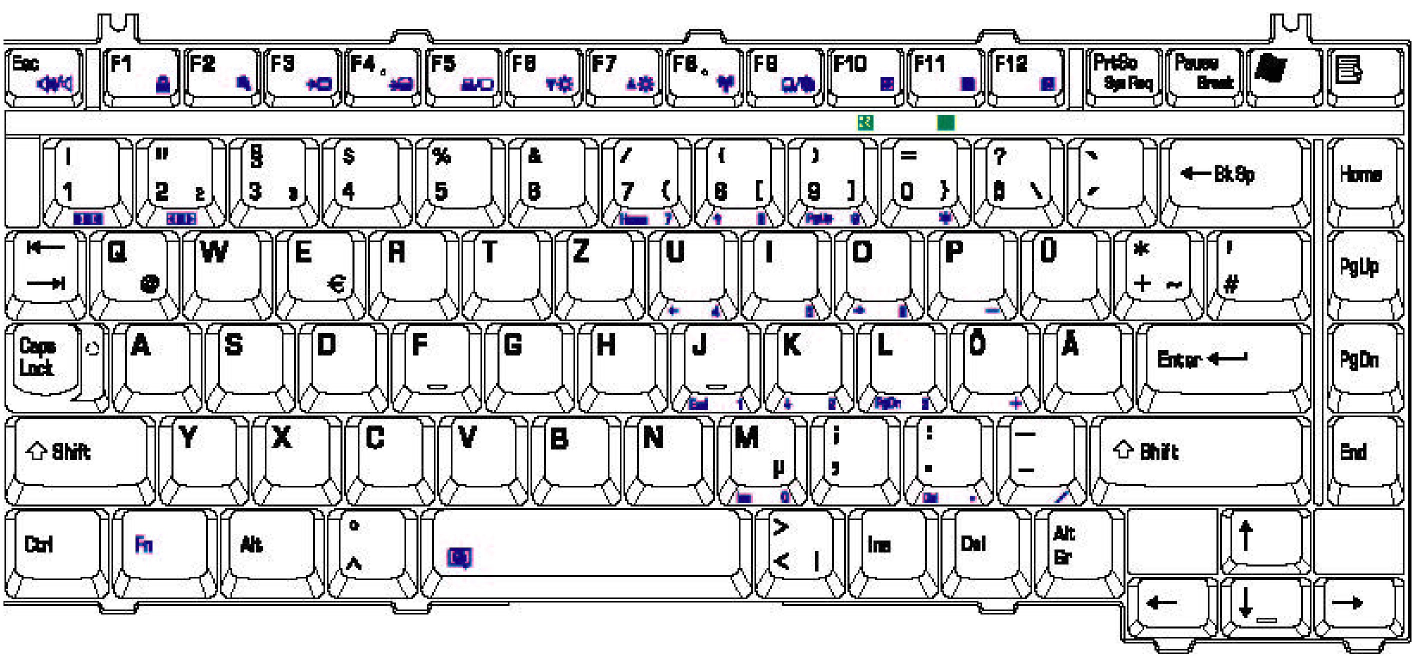


Figure E-9 GR keyboard

E.10 France (FR) Keyboard

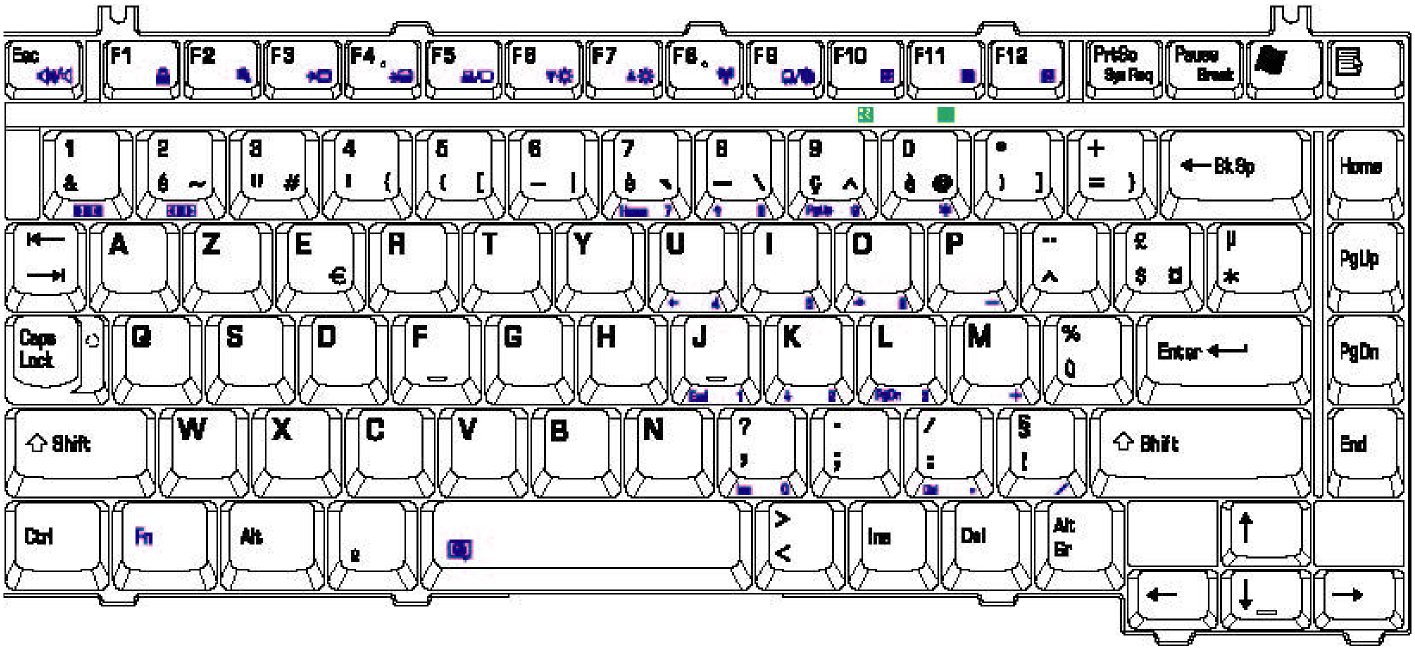


Figure E-10 FR keyboard

E.11 Chinese (CH) Keyboard

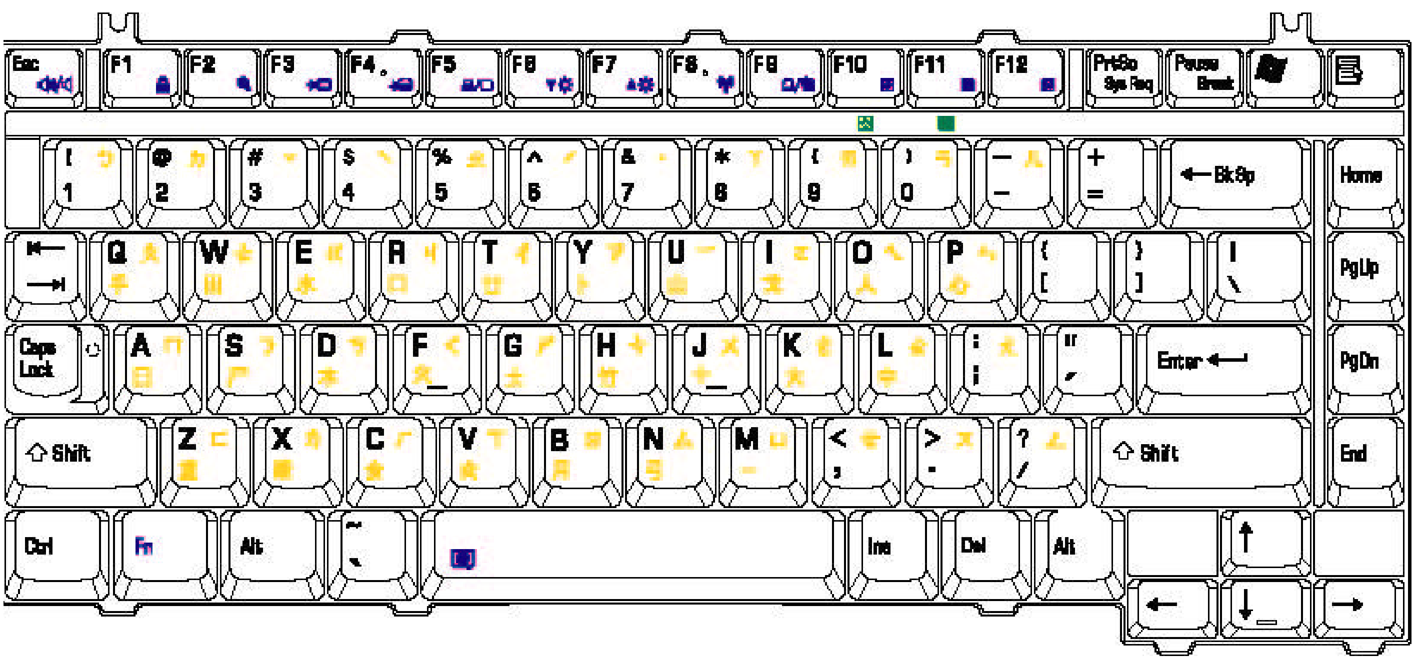


Figure E-11 CH keyboard

E.12 Swissc-Darfon(SG) Keyboard

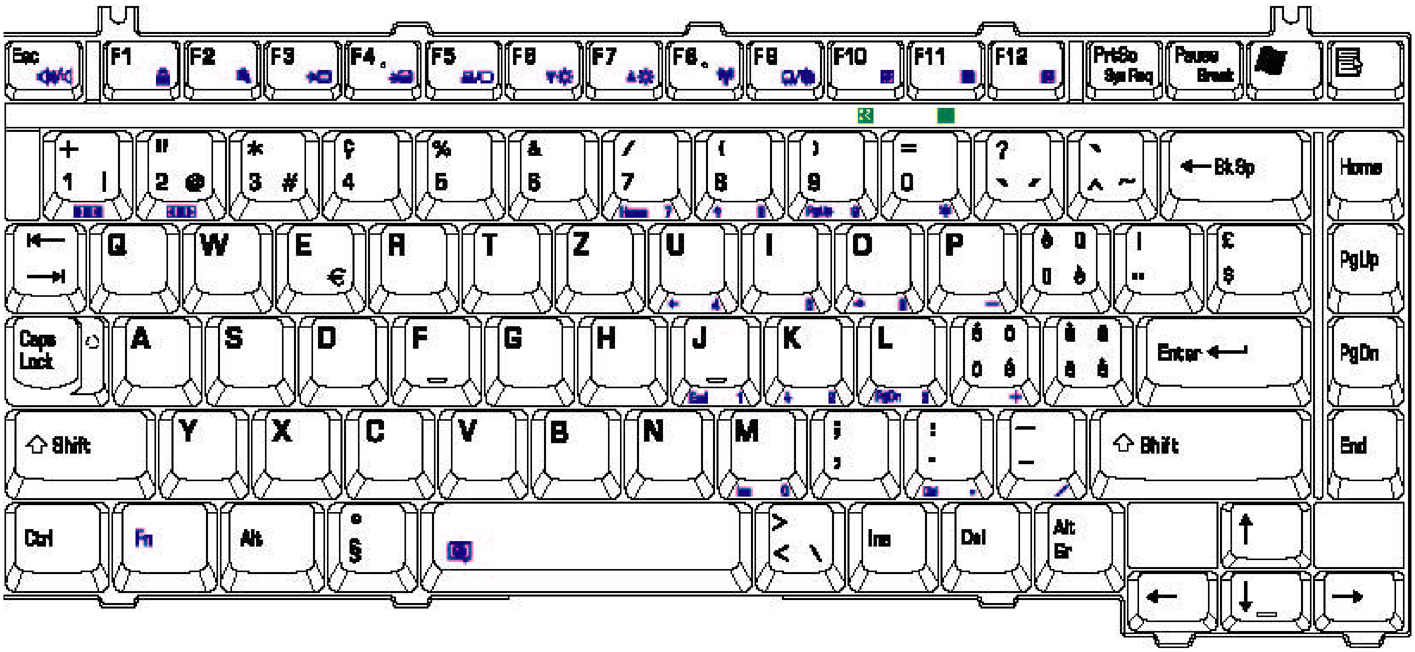


Figure E-12 Swissc-Darfon keyboard

E.13 Italian (IT) Keyboard

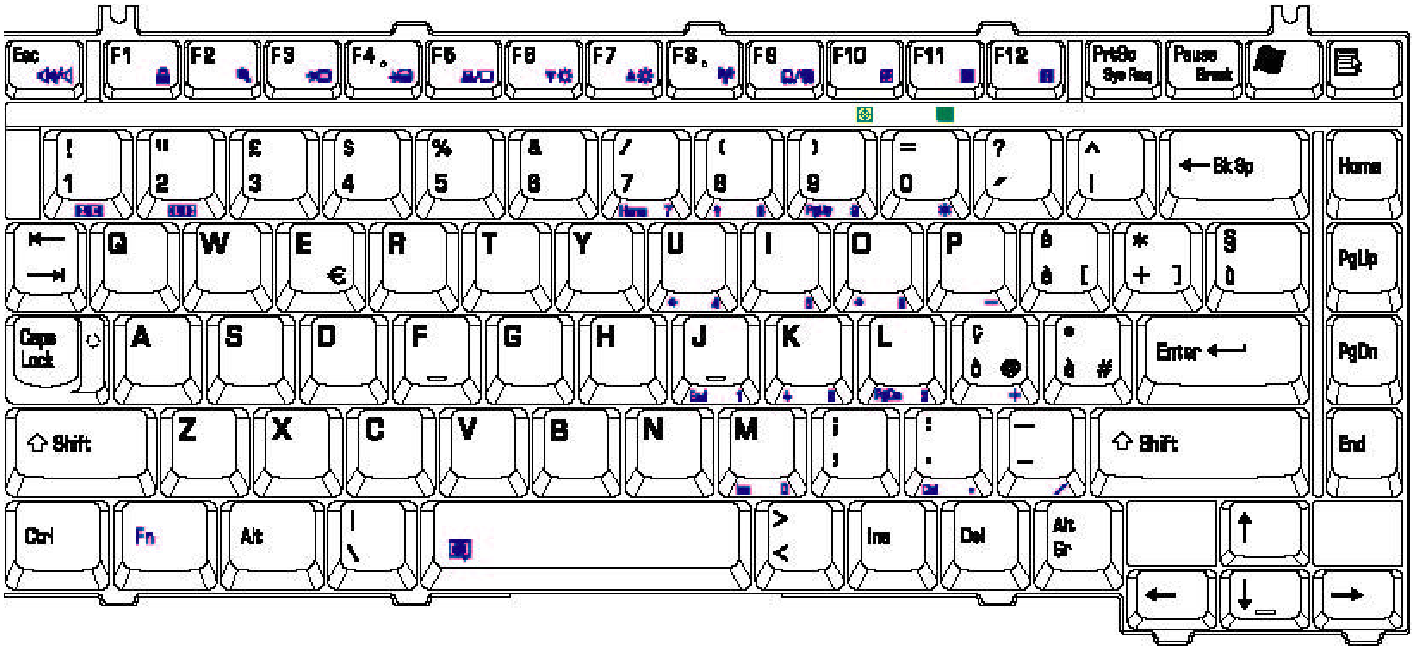


Figure E-13 IT keyboard

E.14 Belgiun (BE) Keyboard

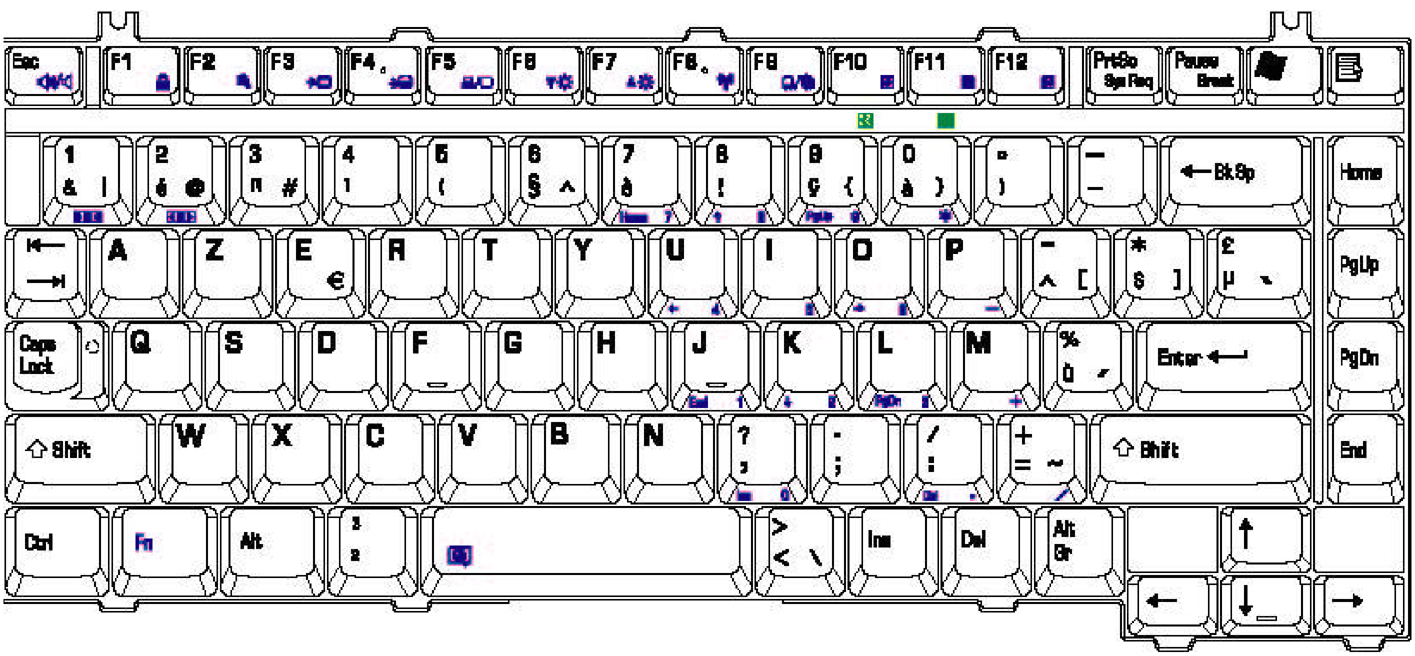


Figure E-14 BE keyboard

E.15 Arabic (AR-E) Keyboard

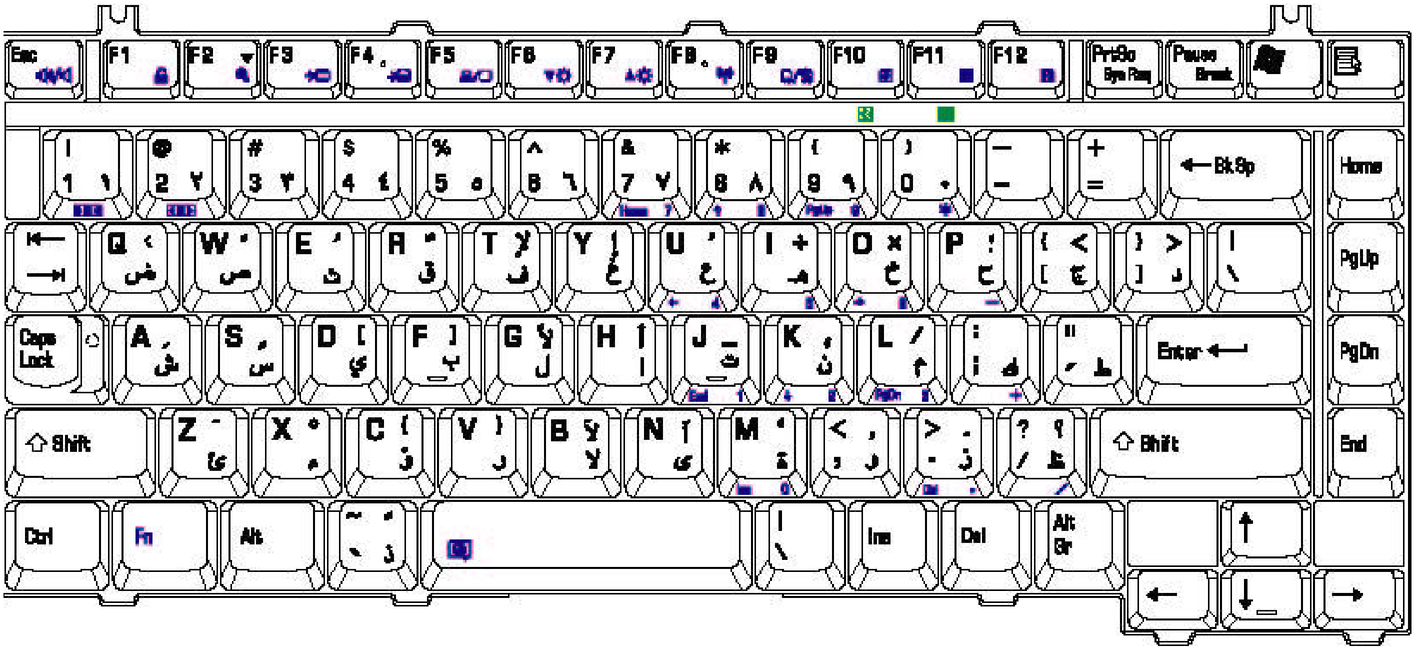


Figure E-15 AR-E keyboard

E.16 Czech (CZ) Keyboard

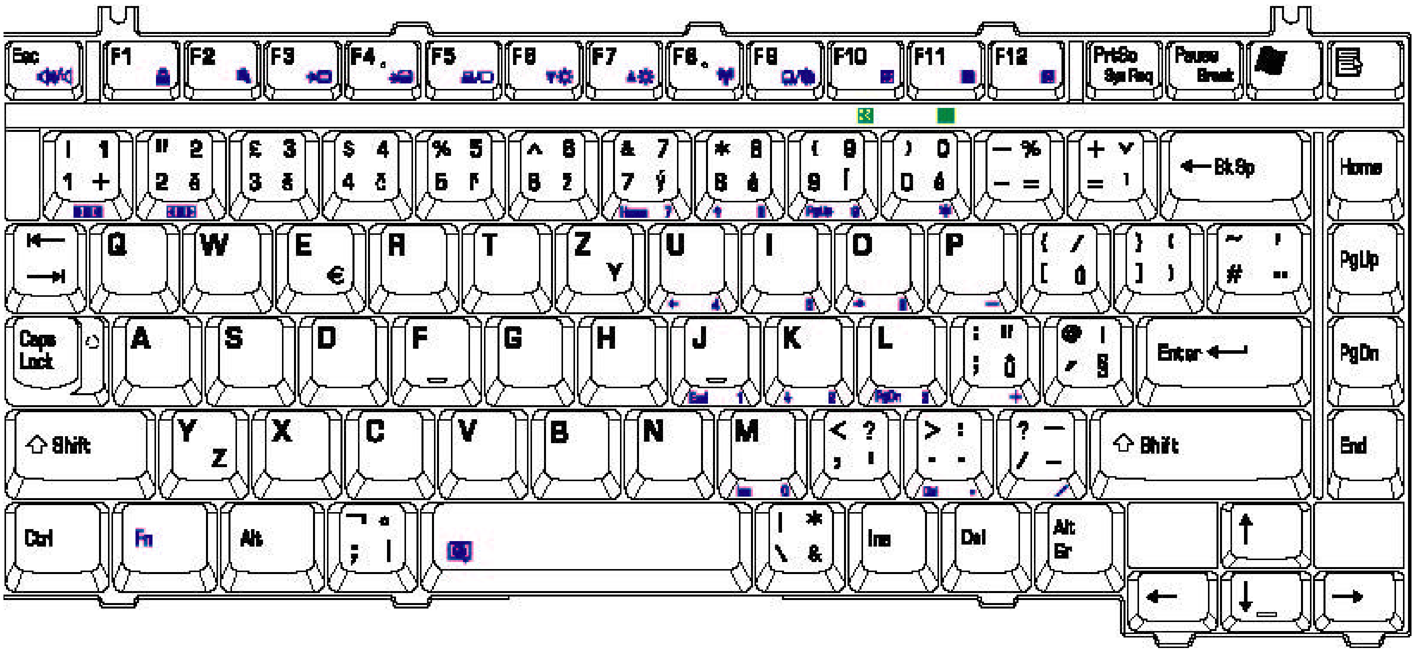


Figure E-16 CZ keyboard

E.17 Estonian (EST) Keyboard

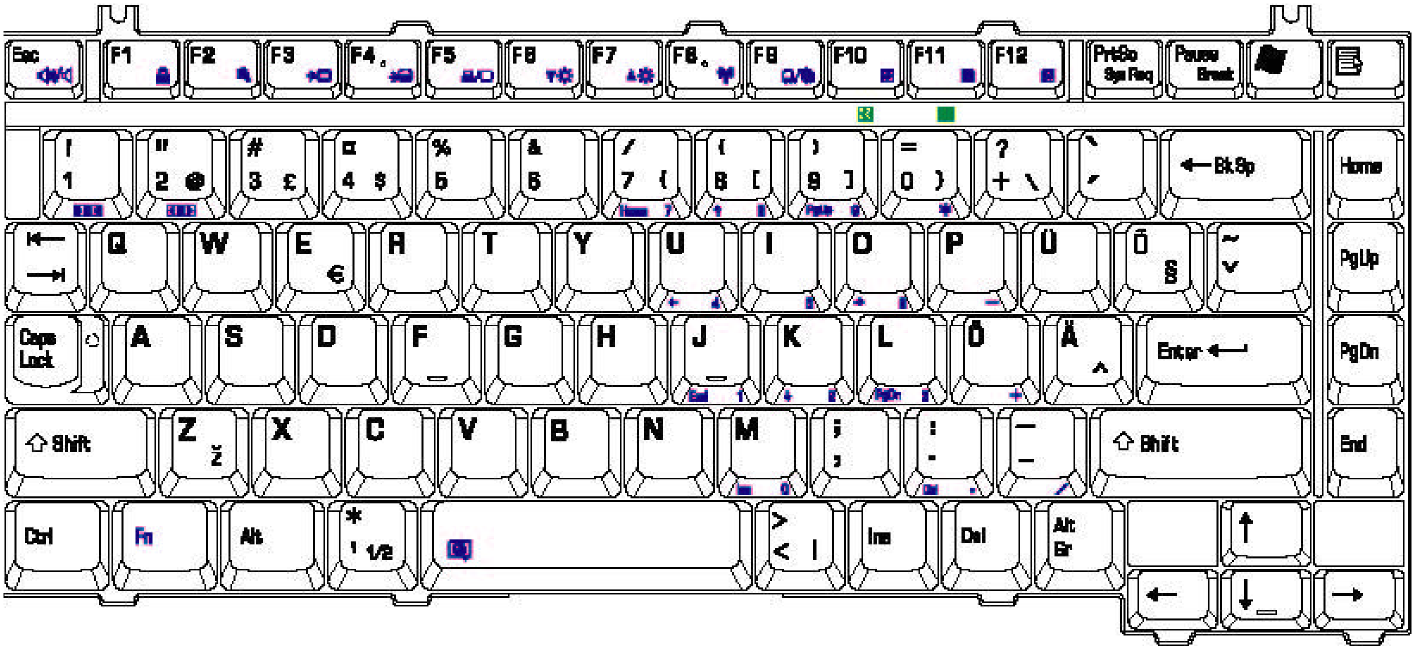


Figure E-17 EST keyboard

E.18 Greek (GK) Keyboard

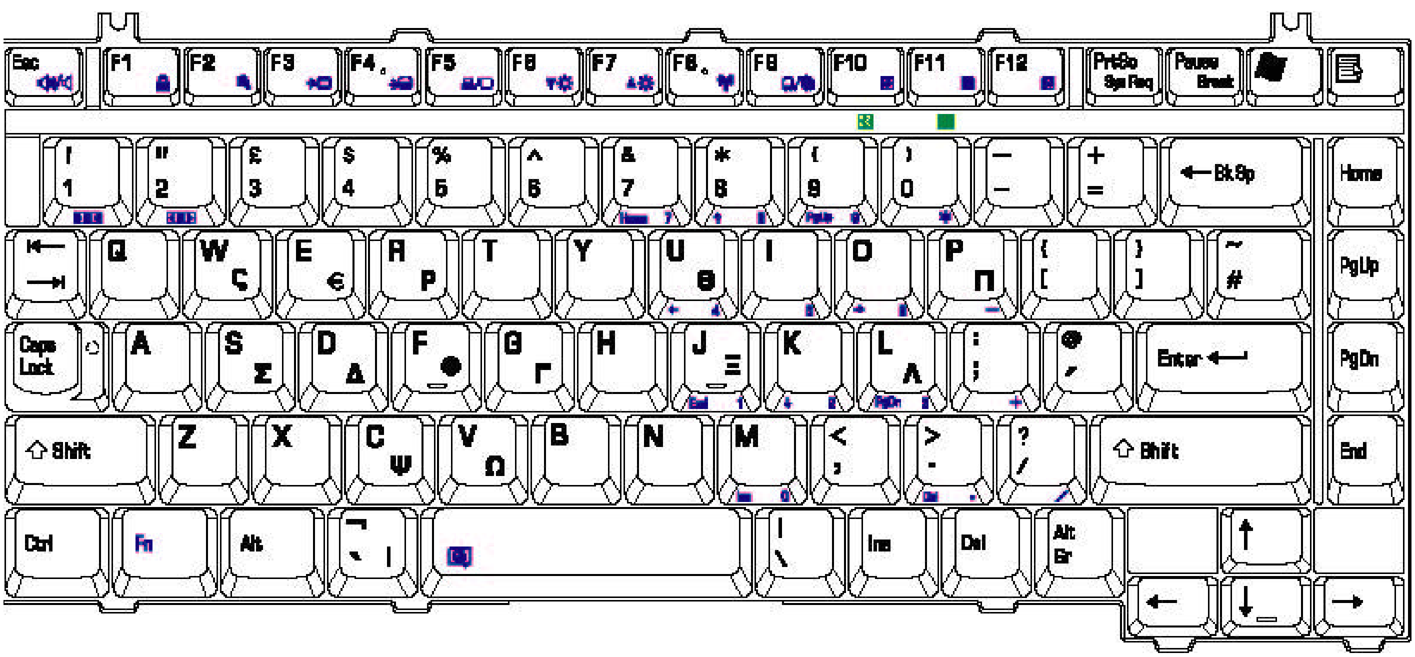


Figure E-18 GK keyboard

E.19 Hebrew (HB) Keyboard

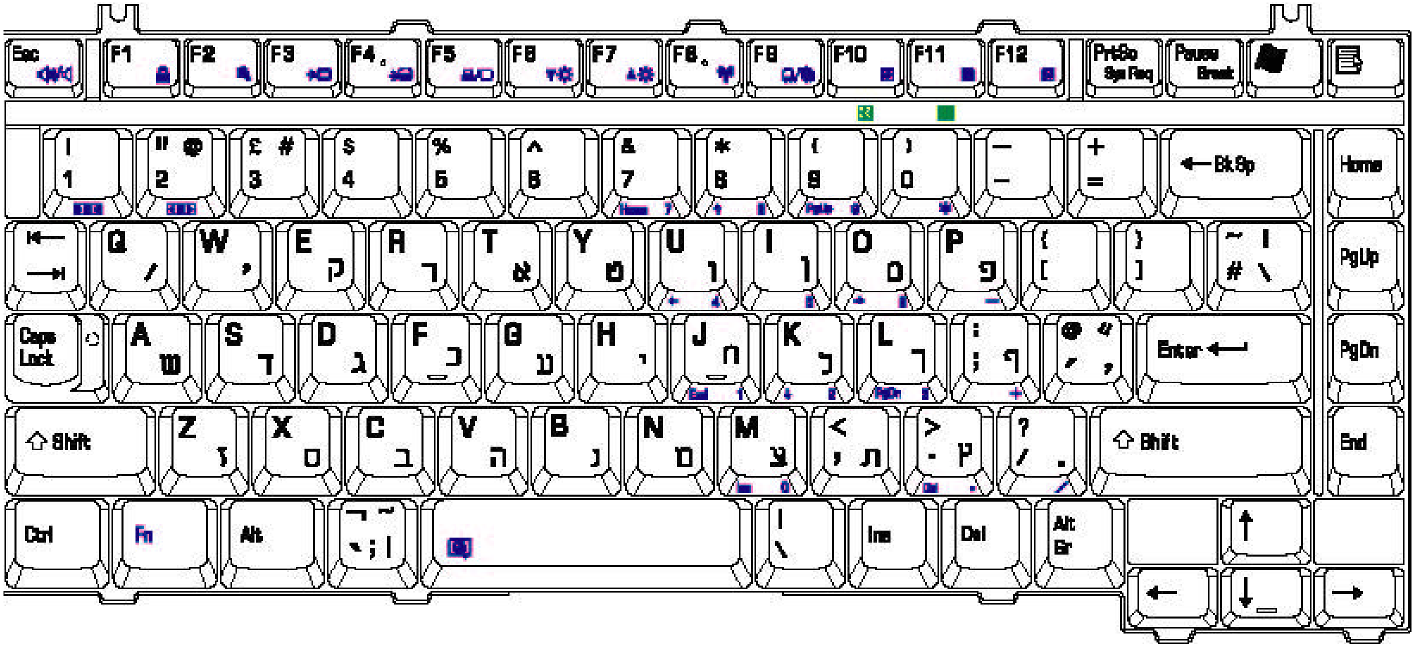


Figure E-19 HB keyboard

E.20 Hungary (HG) Keyboard

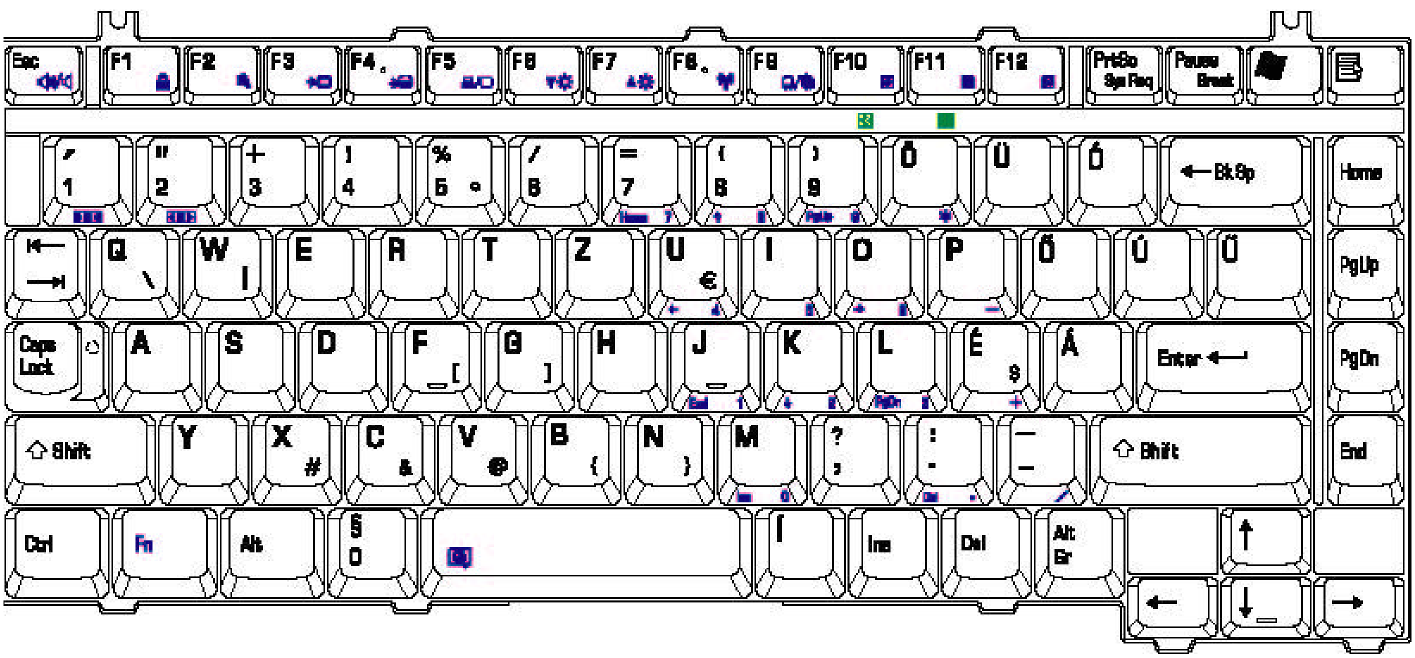


Figure E-20 HG Keyboard

E.21 Norwegian (NW) Keyboard

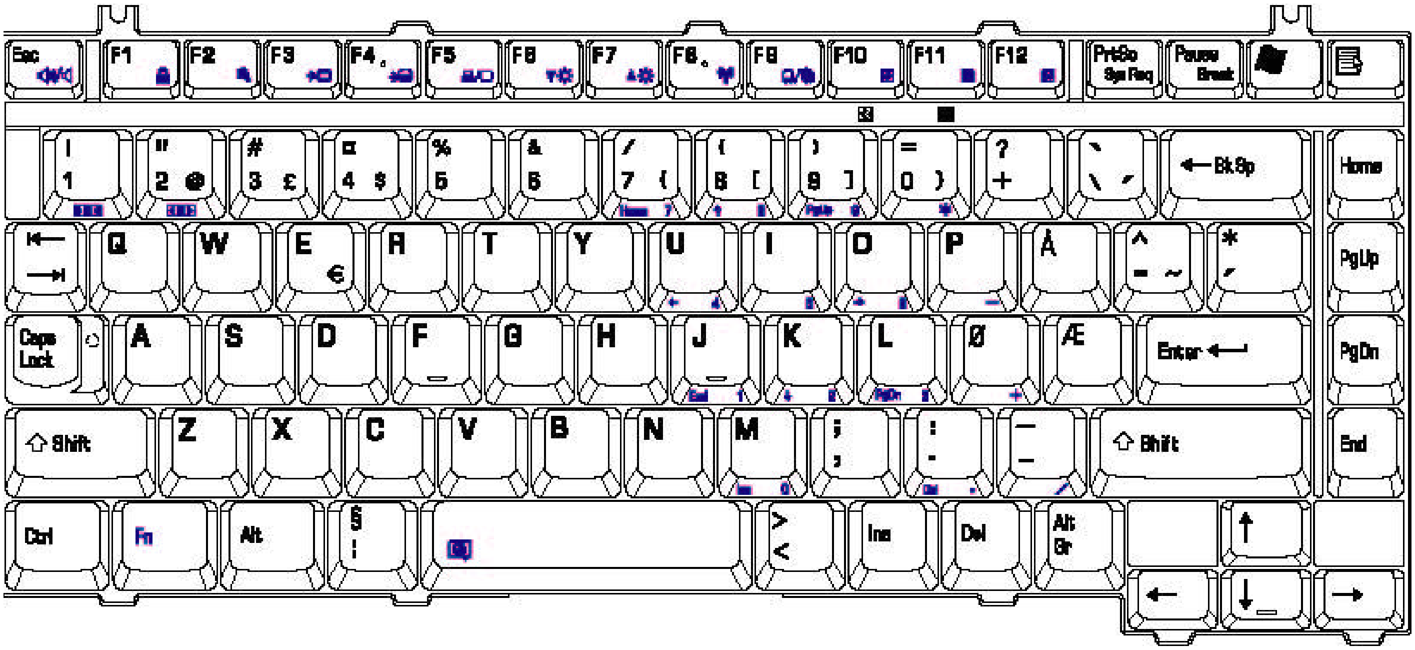


Figure E-21 NW keyboard

E.22 Dutch (DT) Keyboard

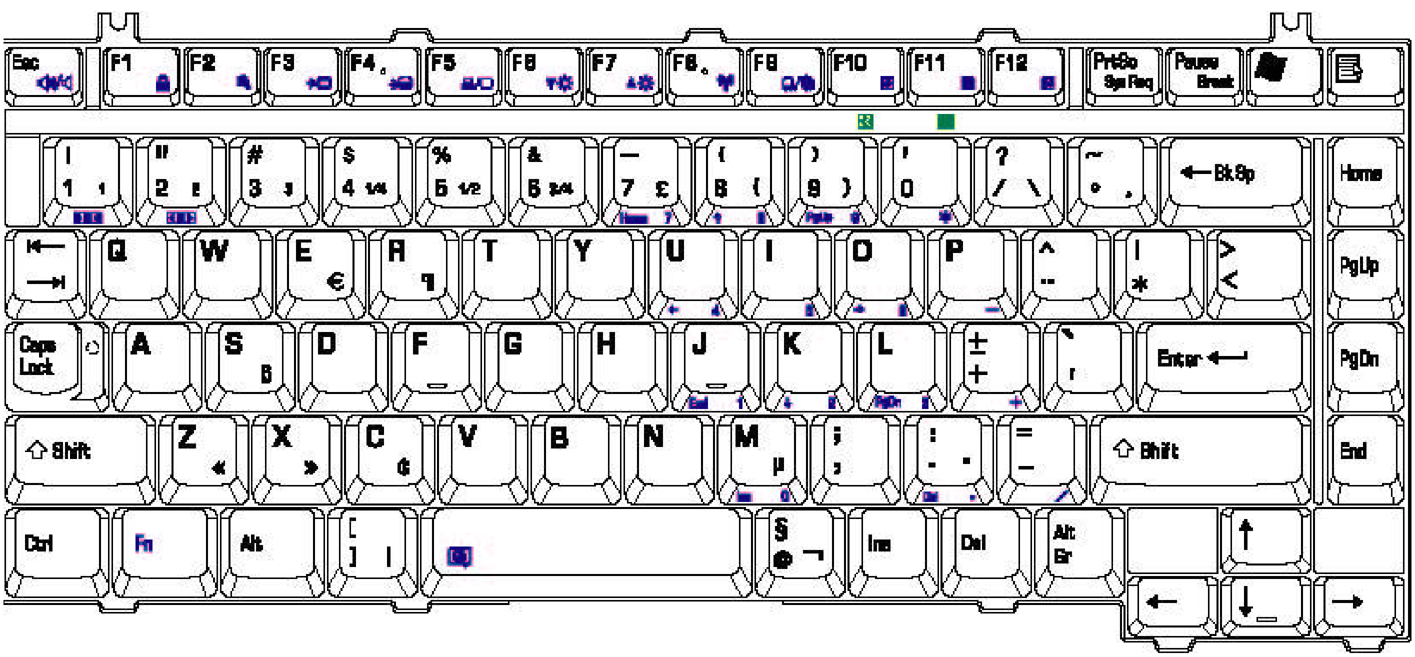


Figure E-22 DT keyboard

E.23 Lithuanian (LIT) Keyboard

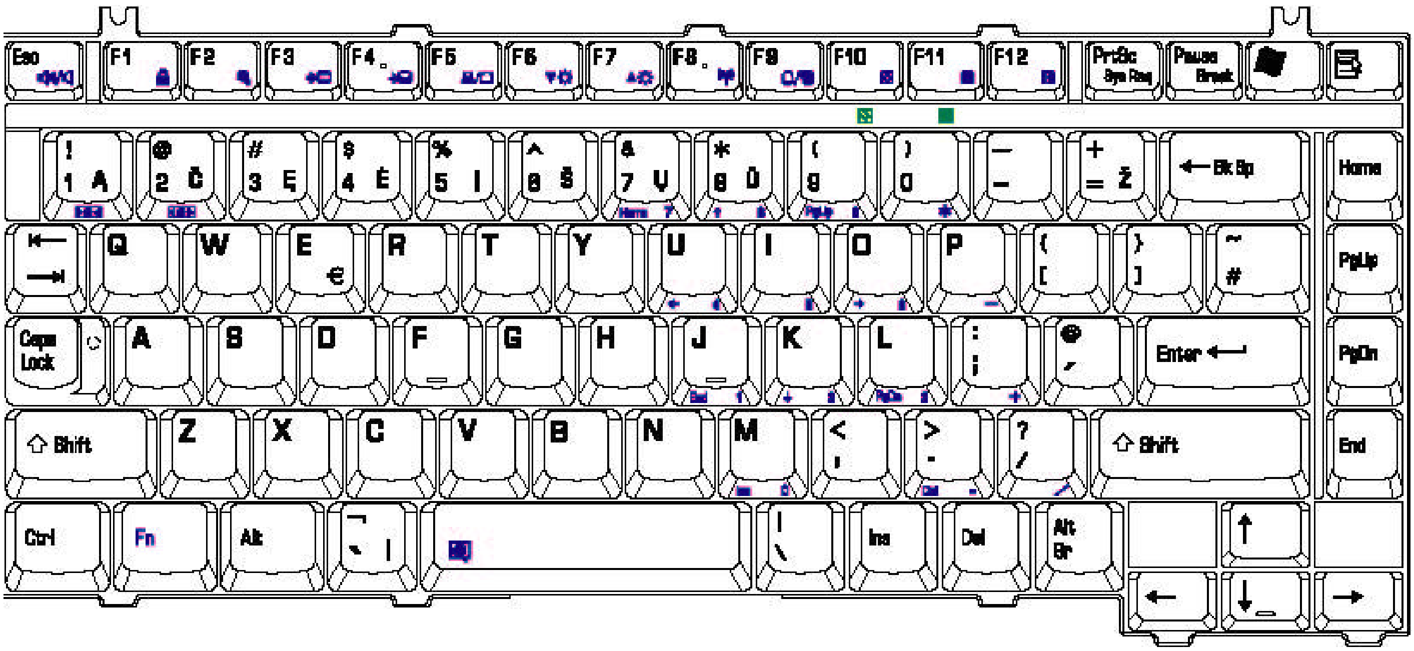


Figure E-23 LIT keyboard

E.24 Russian (RU) Keyboard

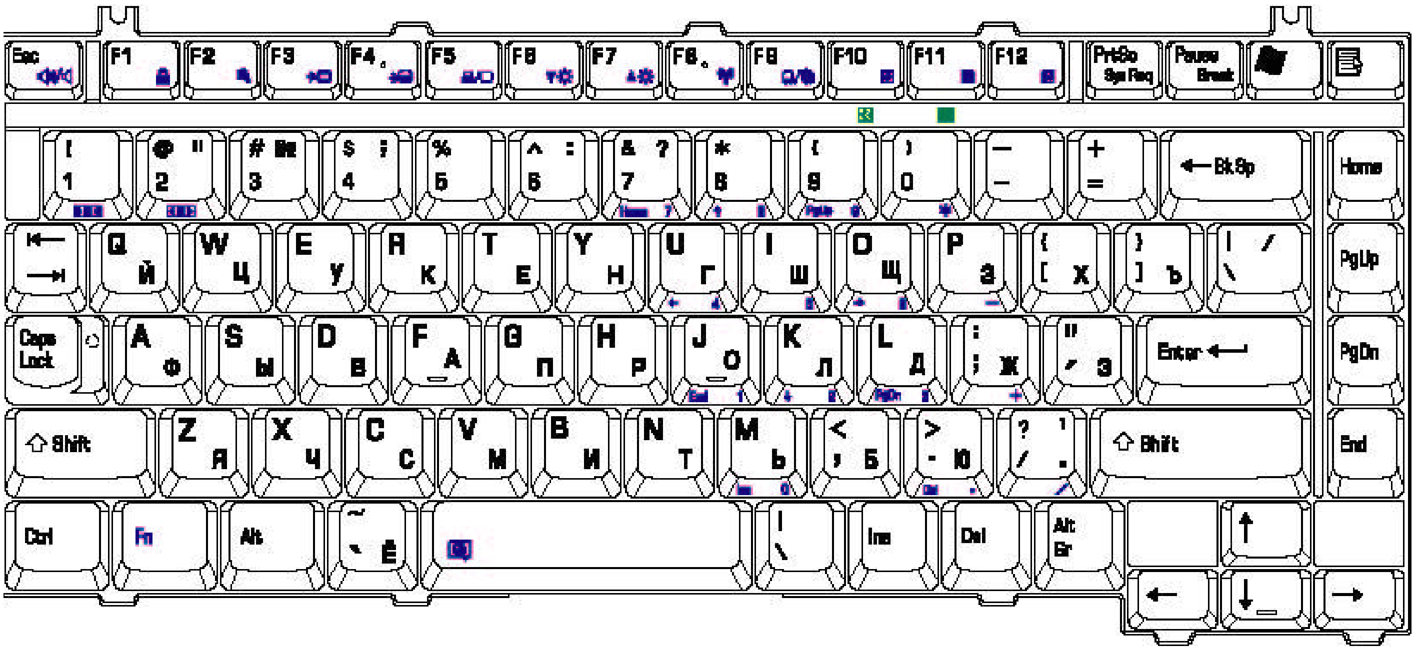


Figure E-24 RU keyboard

E.25 Turkish (TR) Keyboard

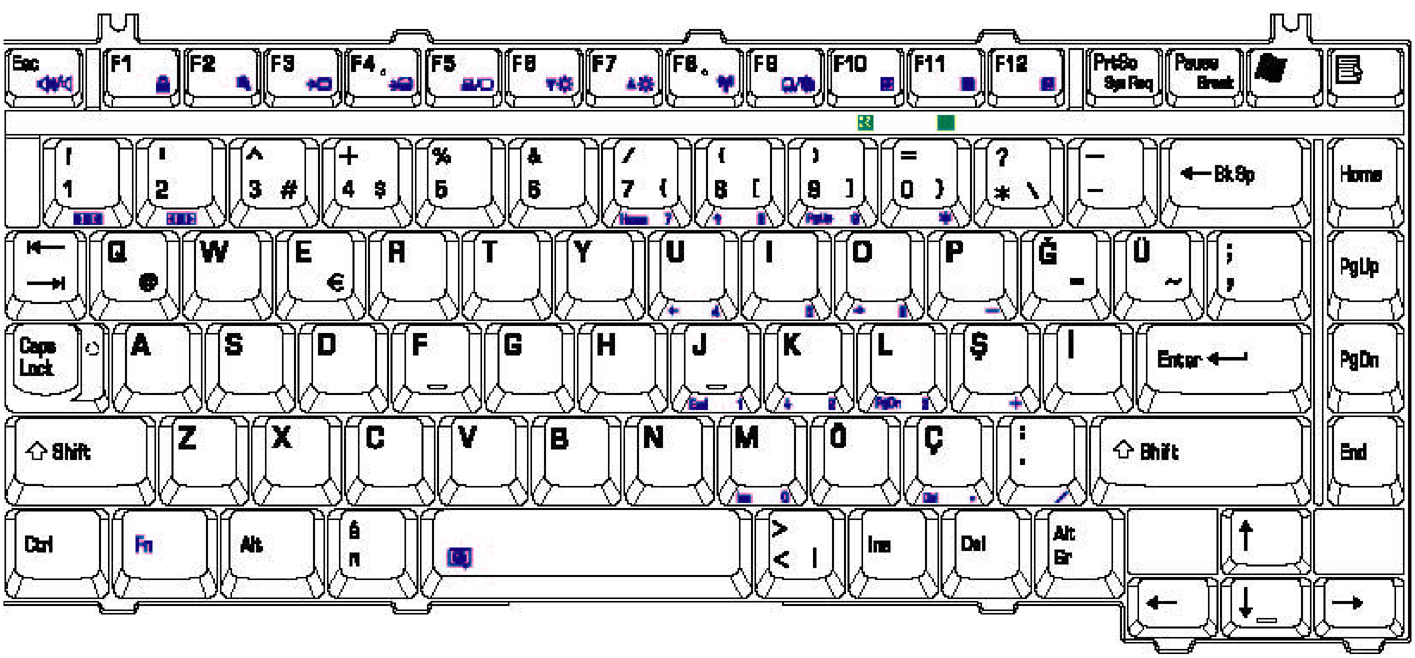


Figure E-25 TR keyboard

E.26 Yugoslavian (YU) Keyboad

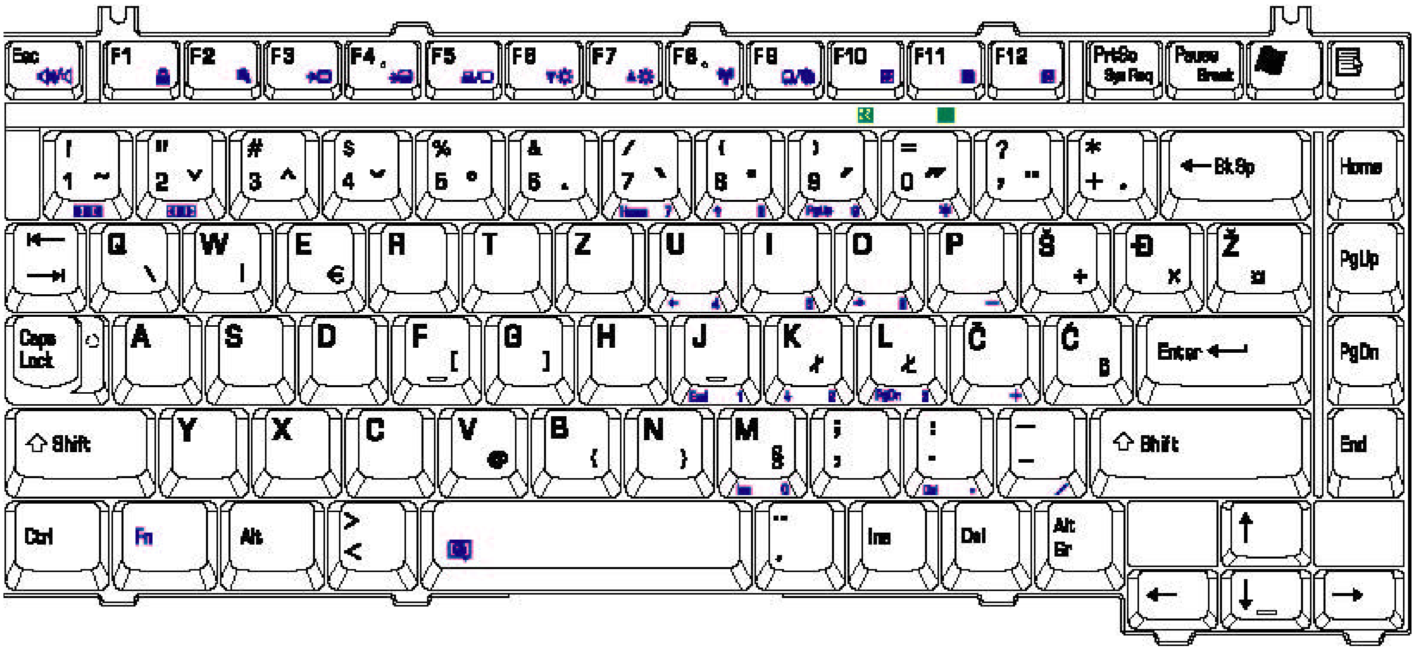


Figure E-26 YU keyboard

E.27 Danish (DM) Keyboard

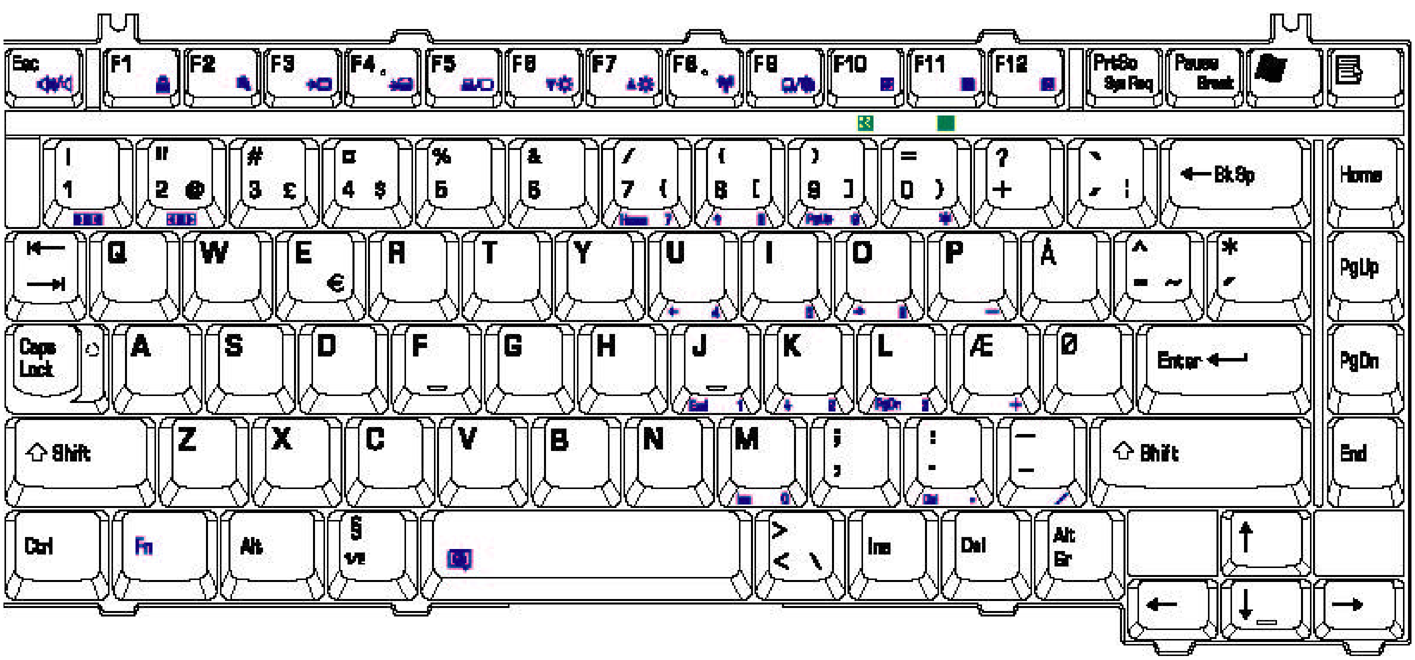


Figure E-27 DM keyboard

E.28 Slovak (SA) Keyboard

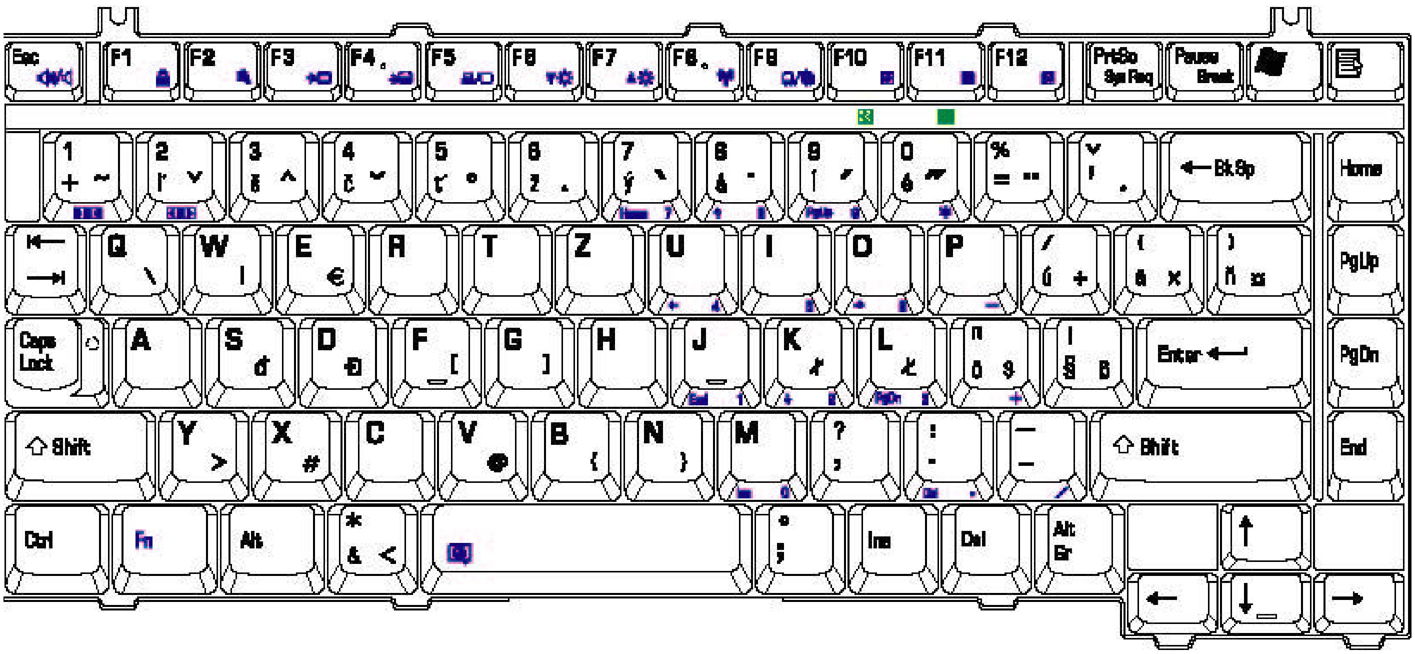


Figure E-28 SR keyboard

E.29 Swedish (SD) Keyboard

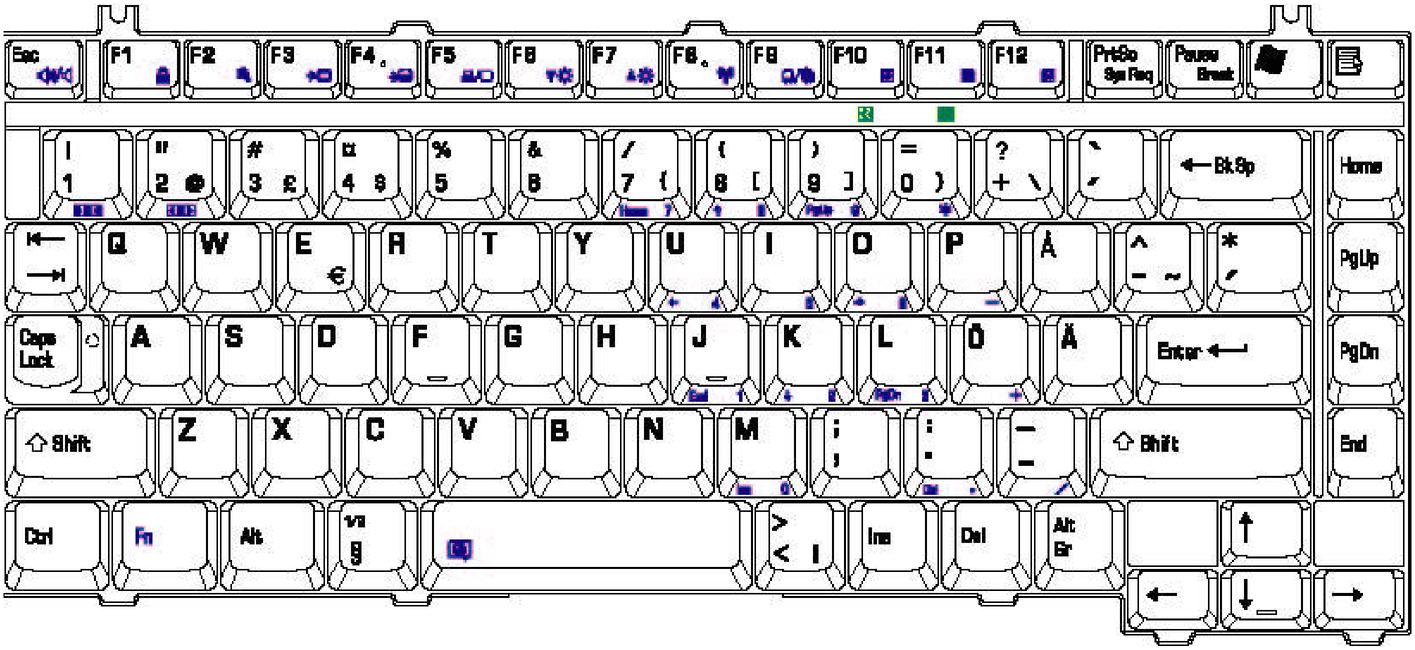


Figure E-29 SD keyboard

E.30 Swiss (SW) Keyboard

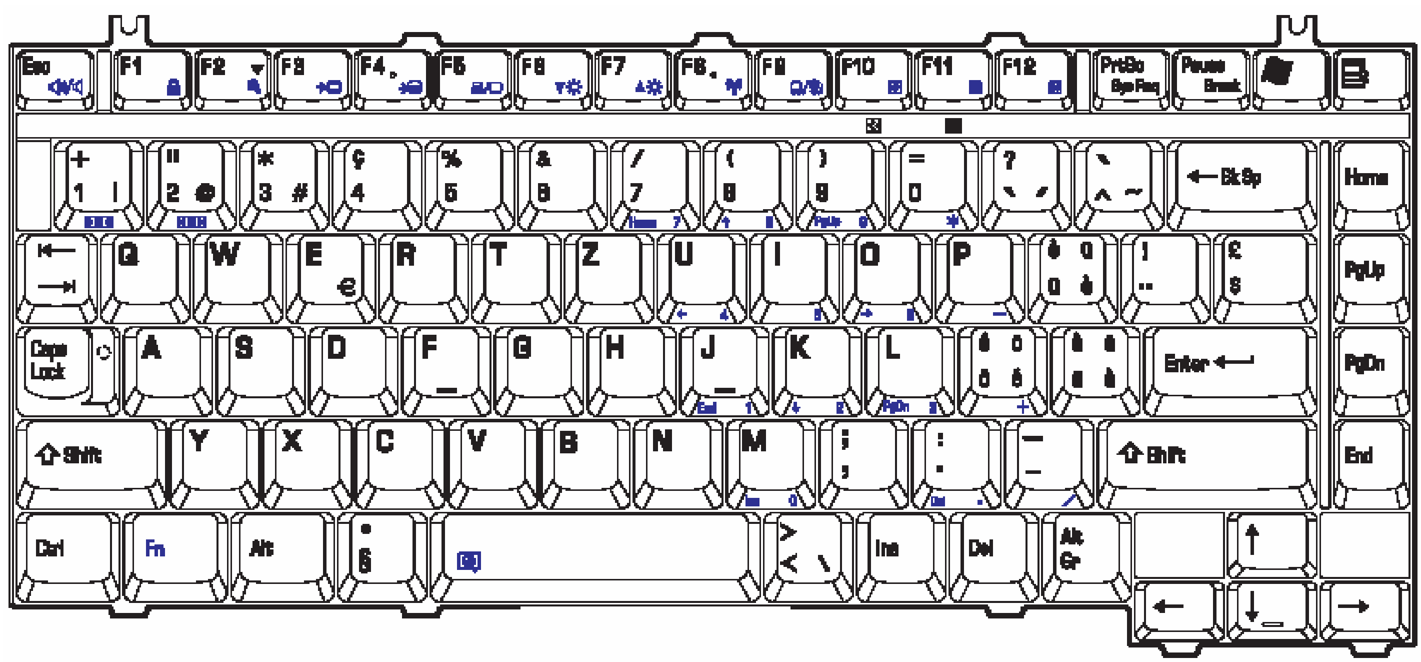


Figure E-30 SW keyboard

E.31 Japanese (JA FLAT GRAY) Keyboard

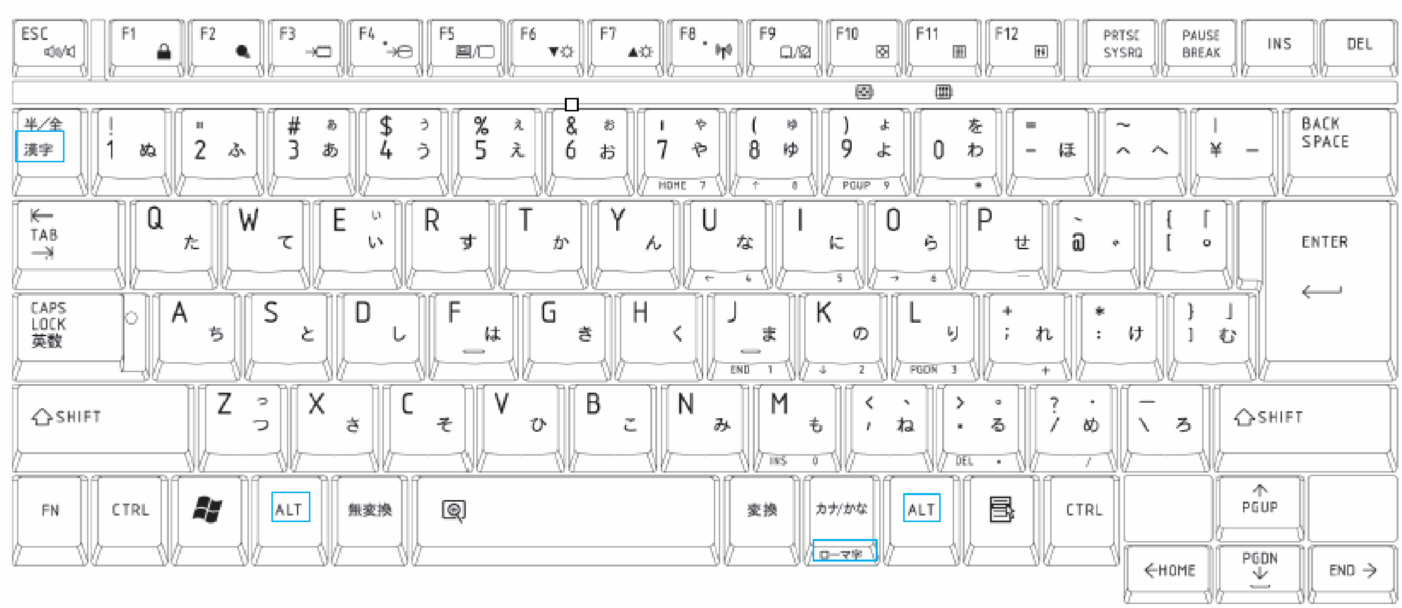


Figure E-31 JA(flat gray) keyboard

E.32 Japanese (JA BIG FLAT GRAY) Keyboard

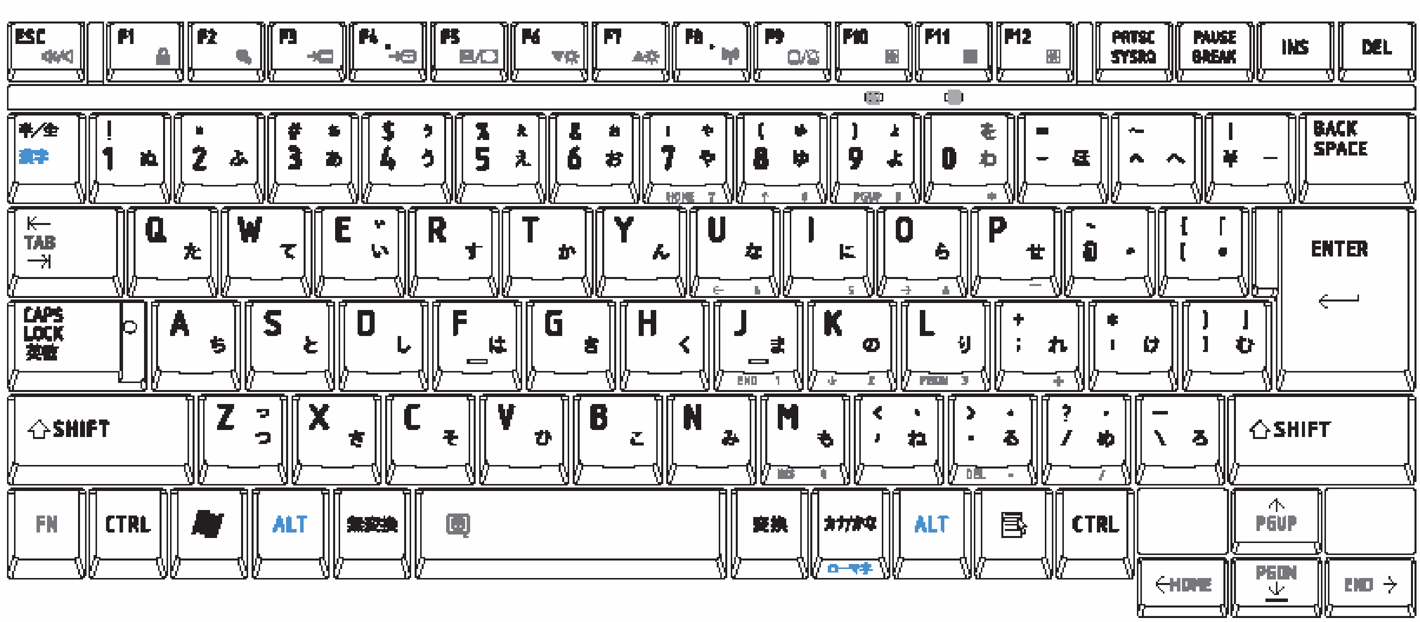


Figure E-32 JA(big flat gray) keyboard

E.33 Japanese (JA FLAT black) Keyboard

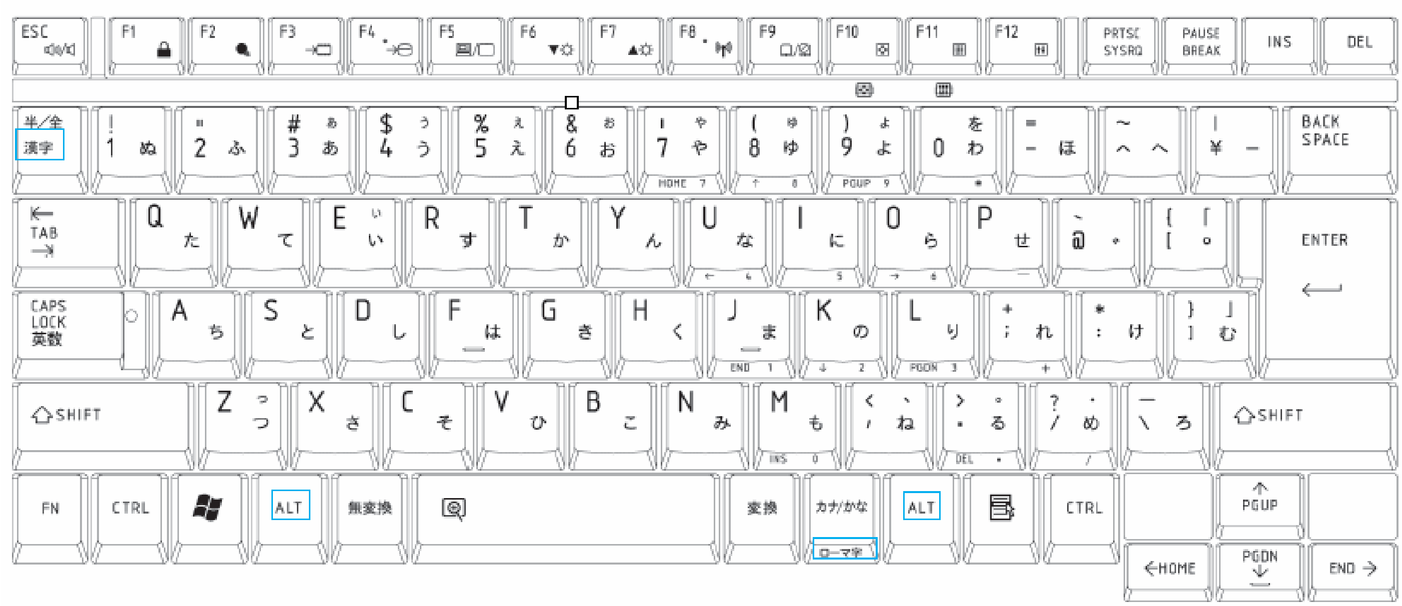


Figure E-33 JA(flat black) keyboard

Appendix F Series Screw Torque List

Table F-1 Series Screw Torque List

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
LCD ASSY				
MAAA0015320	M2X3	8	LCD BRK TO LCD PANEL	1.5~2.0kg
MAC925006Z0	M2.5X6	2	LCD PANEL ASSY TO COVER SUB ASSY (R+L)	2.5~3.0kg
MAAA0015320	M2X3	1	INVERTER TO COVER SUB ASSY	2.5~3.0kg
MAC925003Z0	M2.5X3	1	LCD CABLE TO COVER SUB ASSY	2.5~3.0kg
MAC925006Z0	M2.5X6	4	LCD BEZEL TO COVER SUB ASSY	2.5~3.0kg
MB ASSY				
MAC925003Z0	M2.5X3	1	THERMAL FAN TO MB	2.5~3.0kg
MAC925006Z0	M2.5X6	2	THERMAL FAN TO MB	2.5~3.0kg
MAC925003Z0	M2.5X3	4	THERMAL FIN TO MB	2.5~3.0kg
MAC925003Z0	M2.5X3	1	VGA BOARD TO MB	2.5~3.0kg
MAC925003Z0	M2.5X3	3	VGA HEAT SINK TO VGA BOARD	2.5~3.0kg
HDD ASSY				
MAAA4303000	M3X3	4	HDD BRACKET L/R TO HDD MODULE	3.0~3.5kg
ODD MODULE SUB ASSY				
MAAA0015320	M2X3	2	MODULE LOCK BRACKET TO XDROM MODULE	2.5~3.0kg
LOG UPPER SUB ASSY				
MAC925003Z0	M2.5X3	3	HINGE SADDLE (L+R) TO UPPER	2.5~3.0kg
MAC925003Z0	M2.5X3	1	TRACK PAD BRACKET TO LOGIC UPPER	2.5~3.0kg
MAC925003Z0	M2.5X3	3	SWITCH BOARD TO LOGIC UPPER	2.5~3.0kg
MAC925003Z0	M2.5X3	2	TP BOARD TO LOGIC UPPER	2.5~3.0kg
LOGIC LOWER SUB ASSY				
MAC925003Z0	M2.5X3	4	SPEAKER TO LOGIC LOWER(L/R)	2.5~3.0kg

LOGIC ASSY				
MAC925003Z0	M2.5X3	4	MB ASSY TO LOGIC LOWER	2.5~3.0kg
MAC925003Z0	M2.5X3	2	MB_BKT_ASSY TO LOWER	2.5~3.0kg
MAC925003Z0	M2.5X3	2	LOGIC UPPER TO MB ASSY	2.5~3.0kg
MAC925006Z0	M2.5X6	2	LOGIC UPPER TO MB ASSY	2.5~3.0kg
MACK25001Z0	M2.5X12	1	LOGIC UPPER TO MB ASSY	2.5~3.0kg
MAC925003Z0	M2.5X3	4	MB ASSY TO LOGIC LOWER	2.5~3.0kg
MAC925003Z0	M2.5X3	2	EXPRESS BOARD TO LOWER	2.5~3.0kg
MAC925006Z0	M2.5X6	2	LCD ASSY TO LOGIC UPPER ASSY	3.0~3.5kg
MAAA0015320	M2X3	2	BLUETOOTH TO MB	2.5~3.0kg
MAAA0015320	M2X3	2	KEYBOARD TO LOGIC ASSY	2.5~3.0kg
MAC925003Z0	M2.5X3	2	HDD MODULE SUB ASSY TO LOGIC LOWER	2.5~3.0kg
MAC925003Z0	M2.5X3	2	MDC BOARD TO LOGIC	2.5~3.0kg
MACA2500150	M2X4	1	MINI PCI DOOR ASSY TO LOGIC LOWER	2.5~3.0kg
MACK25001Z0	M2.5X12	13	LOGCLOWER TO LOGIC UPPER	2.5~3.0kg
MAC925006Z0	M2.5X6	1	XDROM ASSY TO LOGIC ASSY	2.5~3.0kg
MACK25080Z0	M2.5X8	4	LOGCLOWER TO LOGIC UPPER	2.5~3.0kg
MAFA94001N0	HEXAGONAL NUT	2	VGA PORT TO LOGIC ASSY	2.5~3.0kg

Appendix G Reliability

The following table shows MTBF (Mean Time Between Failures) for each component.

Table G-1 MTBF

Component	Time (hours)
LCD	10,000
Keyboard	60,000
HDD	300,000
Removable FDD	30,000
Optical (DVD/CD) drive	60,000
AC adaptor	100,000